VOLUME CI NUMBER THREE

# THE NATIONAL GEOGRAPHIC MAGAZINE

MARCH, 1952

New Map of North America
28 by 35 Inches, in 10 Colors

Work-hard, Play-hard Michigan
With Map and 40 Illustrations
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White Magic in the Belgian Congo
With Map and 41 Illustrations
30 in Natural Colors — W. ROBERT MOORE

Barbados, Outrider of the Antilles
With Map and 28 Illustrations
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Finding an "Extinct" New Zealand Bird
With Map and 8 Illustrations — R. V. FRANCIS SMITH

Caught in the Assam-Tibet Earthquake
With Map and 11 Illustrations — F. KINGDON-WARD

North America's Altered Face

Sixty-four Pages of Illustrations in Color

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# Work-hard, Play-hard Michigan

By Andrew H. Brown

*With Illustrations from Photographs by the Author*

LOW in the water, the Great Lakes ore boat *William G. Mather* churned downstream in the St. Marys River toward the locks at Sault Ste. Marie, Michigan.

Inside the white blockhouse of U. S. Coast Guard Lookout Station No. 6, perched on a rock on the Michigan side of the stream, the lookout and I watched the long, low-slung vessel draw abreast.

The captain of the *Mather* stepped from wheelhouse to bridge and put megaphone to mouth.

"*William G. Mather,*" he called. "I'm drawing 22 feet."

The lookout watch waved in acknowledgment, picked up the telephone, and advised the locks at "the Soo," five miles downriver: "*William G. Mather,* drawing 22 feet, just went by me." In an aside to me he added, "She's bound for Cleveland with 14,000 tons of upper Michigan iron ore."

### Great Lakes Make Michigan Mighty

The deeply laden vessel felt the tug of current as Lake Superior's brimming outflow urged her toward the locks that overcome the obstacle of St. Marys River rapids.

Two men could sprint 100 yards from either end of the *Mather* before they met. Here were 600 feet of steel vessel gliding along 600 miles from the nearest Atlantic salt water.

Standing right where we were, night and day, from April to December, we could have watched 22,493 ships go by this spot. Not all were different vessels, of course. Many of them were the same ships, retracing their route. Some of the cargo carriers make up to 40 round trips a season, carrying iron ore, coal, grain, pulpwood, automobiles, and fuel in the Great Lakes trade (pages 284-5).

During the eight months of open navigation, Great Lakes shipping carries nearly two-thirds as much tonnage as the total annual offshore trade through all United States salt-water seaports (pages 290 and 312). Michigan, embraced in four of the five Great Lakes, is deeply involved in this stupendous traffic. Most of it skirts her shores. Her lighthouses, locks, and foghorns guide it. She brings mail to the endless procession of ships.*

Without the "American Mediterranean," iron ore could not move by boat from Michigan's mines to mills, nor could her requirements in grain, fuels, and raw materials be shipped in so cheaply. Fifteen percent of the Detroit area's automobile output travels to markets by ship.

These Lakes give Michigan inland seaports. Detroit alone had 109 general cargo sailings to foreign ports in 1951, compared with 68 in 1950. A firm shipping machinery from Muskegon, on Lake Michigan, to England or Scandinavia saves $10 to $18 a ton by the all-water route as compared with movement by rail to New York and transfer to ocean vessel. Construction of the St. Lawrence Seaway would greatly swell this direct trade.

Lakes Superior, Michigan, Huron, and Erie give Michigan a shore line only 100 miles shorter than the United States' entire Pacific coast (map, pages 282-3).

### Cool Forests Lure Vacationists

Especially in summer's time of holidays, the Great Lakes provide Michigan with priceless air conditioning. Water-moderated breezes extend the Lower Peninsula's fruit belt far north along the Lake Michigan coast.

Michigan has many thousand inland lakes,

* See "*J. W. Westcott,* Postman for the Great Lakes," by Cy La Tour, National Geographic Magazine, December, 1950.

**Detroit Celebrates Its 250th Birthday with a Fireboat's Watery Five-gun Salute**

The 47-story Penobscot Building (left), topped by a television antenna, is the city's highest.

hundreds of them set in wilderness. North of an imaginary east-west line between Saginaw Bay and Lake Michigan the State is largely forest-clad, a sportsman's and vacationist's realm of alluring spaciousness and varied appeal.

Michigan's people are concentrated south of this area; about nine-tenths live in the southern two-fifths of the State. Upstate, in the north of Lower Peninsula and throughout Upper Peninsula, thinly inhabited wooded reaches are little changed from the days of French missionary-explorers, Revolutionary skirmishes, and the pioneer "landlooker."

With all this play space, tourism in Michigan naturally is a leading source of income; it vies with agriculture for second place to automobile making, unchallenged king

Here 100 Frenchmen Built a Fort in 1701

1,850,000 Americans make the city our fifth biggest.

among the industries of this diversified State.

Michigan sold more than a million fishing licenses in 1951 and about 400,000 permits to hunt deer. Forty cents of every tourist dollar is spent by State residents.

Among its natural wonders and resources, Michigan counts antique water—a third of a billion years old. In tunnels of a salt mine, 1,130 feet under south Detroit, I dipped one hand into a tank of soapy-looking liquid.

"That's 'fossil' water 300 million years old," my guide prosaically announced. "It's handy for washing cuttings from drill bits."

Every now and then probing pick or drill releases a gush of this aged-in-the-salt $H_2O$. The manager of the mine, an International Salt Company property, gave me a transparent cube of salt. In tubelike channels within it, two tiny globules of ancient sea water—gleaming captives of eternity—slipped back and forth, like bubbles in a carpenter's level.

### Michigan Could Salt the Whole World

Waters of a shallow Silurian sea that eons ago engulfed Michigan left riches in thick salt deposits. Today the State leads all the 48 in salt production. Layers of sooty-white sodium chloride underlie much of the Lower Peninsula.

Geologists say Michigan's known salt reserves could supply the entire world's needs for millenniums to come.

Humdrum salt is a basic raw material of the fast-expanding chemical industry; rich brine deposits located the huge parent plant of the Dow Chemical Company at Midland, Michigan. Michigan farmers spread salt with fertilizer on sugar beet fields; salt increases the yield of beets and makes them sweeter.

Last summer, on a swing through Michigan, I drove first to dynamic Detroit. Symbol of America's productive capacity, Greater Detroit makes 9,000 motor vehicles every 24 hours and, in addition, a swelling volume of defense goods. Its automobiles, trucks, and buses have changed human habits and reshaped the face of the earth.*

Detroit's family income surpasses that of any other large city in the world; Detroiters drive more cars, in proportion to population, than any other major United States city except Los Angeles. The Detroit area supports nearly half Michigan's people; her industries and businesses account for 54 percent of the State's income.

### University's 107th Commencement

Not Detroit, however, but the rest of Michigan was my goal on this journey. After a brief visit in the amazing motor city, I set out to explore the great State beyond.

Driving west to Ann Arbor, I attended the 107th commencement of world-renowned University of Michigan. To accommodate 3,814 candidates for 47 different degrees, as well as parents, faculty, and friends, Michigan staged the ceremonies in the football stadium, capacity 97,000.

The University of Michigan began its career in Detroit. Public-spirited men pushed through

* See "Michigan Fights," by Harvey Klemmer, National Geographic Magazine, December, 1944.

the Territorial legislature in 1817 "an Act to establish the Catholepistemiad, or University, of Michigania." ("Catholepistemiad," absent from dictionaries, was a "made" word meaning, roughly, "place for acquisition of a wide range of knowledge.")

In 1821 the name was changed to University of Michigan, and in 1837 a gift of 40 acres of land sent the school to Ann Arbor (page 291).

The University, with 17,155 students enrolled in the fall of 1951, was the first major university west of the Appalachians to set up professional schools for the study of medicine (1850) and law (1859). More than half of all who ever have received Michigan Law School diplomas are still alive.

A research leader, Michigan worked out a large-scale method for production of RDX, World War II superexplosive. The late Dr. Max M. Peet of the Medical School developed "miraculous" surgery to relieve high blood pressure by operating on the sympathetic nerve supply to the kidneys and adrenal glands.

With its new giant synchrotron that energizes electrons up to 300,000,000 volts, the University strives to learn more about the mysterious forces that hold together the subnuclear particles composing all matter.

283 Drawn by Harry S. Oliver and Irvin E. Altman

**Four Great Lakes Clasp Michigan in a 2,302-mile Embrace**

The State's shore line exceeds Florida's and almost equals those of California, Oregon, and Washington combined. During wartime the five Great Lakes carried more tonnage than that sent abroad by all our salt-water ports. River and canal float ocean cargoes to Lake ports, but international shipments cannot reach maximum scope unless Canada and the United States complete the deep-water St. Lawrence Seaway (opposite page).

### Where the Republican Party Was Born

West of Ann Arbor I stopped in Jackson, factory town fringed with parks. There I sought out the corner of West Franklin and 2d Streets to read a bronze tablet: "Here, under the oaks, July 6th, 1854, was born the Republican Party, destined in the throes of civil strife to abolish slavery, vindicate Democracy and perpetuate the Union." President William Howard Taft dedicated the tablet in 1910.

Gracious farmlands led to Lansing, the State capital, equidistant from Detroit and Lake Michigan. As I explored the high-ceilinged capitol, it was hard to comprehend that Lansing was a capital site suggested in jest.

Michigan's 1835 constitution stated that the capital "shall be at Detroit . . . until 1847, when it shall be permanently located by the legislature." Detroit, on the border, was felt vulnerable to invasion.

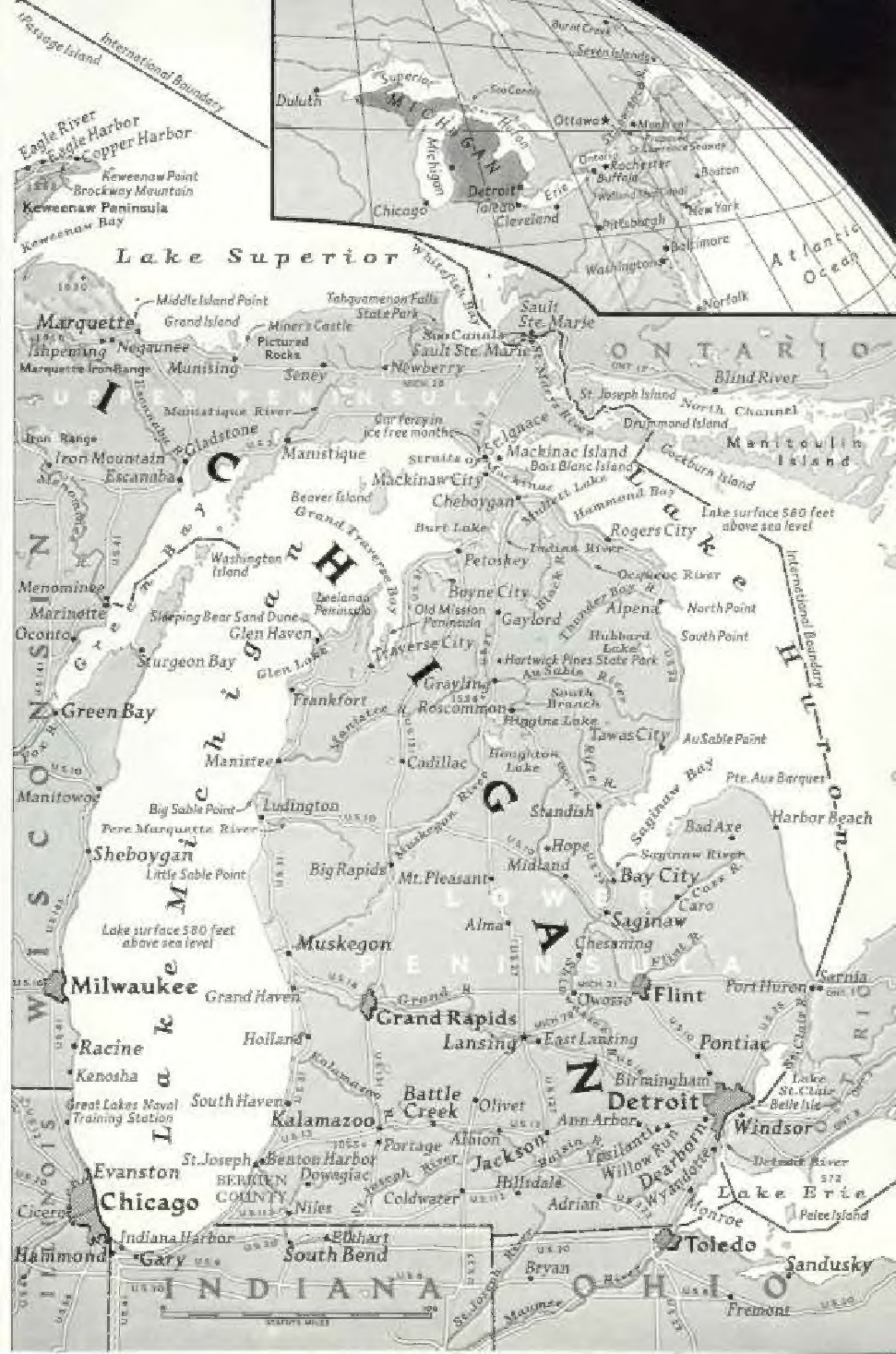
Legislators rejected one after another lower Michigan locality. Finally, in joking mood, someone proposed the wilderness township of Lansing. The legislators laughed—but for want of a better choice finally settled on it. So Michigan's seat of government moved to a frontier clearing with one log house and a sawmill (page 296).

Today the capitol's 267-foot dome is overtopped by near-by Olds Tower, 25 stories high (page 294). Here I sat at the desk of the late Ransom E. Olds, automotive pioneer, who died in August, 1950, at 86. Swinging in Mr. Olds's swivel chair, I looked out the window across Lansing's rooftops to the great Oldsmobile auto plant he brought into being.

Among the first to build a practicable automobile (in 1896), Olds gave his name to the Oldsmobile and later his initials (R.E.O.) to the Reo. Early in the century, Olds was the world's largest motorcar producer, and "In My Merry Oldsmobile" was a theme song of the era.

In Lansing I learned why Michigan is known as the Wolverine State.

"There's no authentic record of a wolverine ever being seen or killed in Michigan," State game biologist F. W. Stuewer told me. "But in the early fur trade days Detroit shipped furs not only from Michigan but also from a wide reach of territory to the west and north.


Passage Island
International Boundary
Eagle River
Eagle Harbor
Copper Harbor
Keweenaw Point
Brockway Mountain
Keweenaw Peninsula
Keweenaw Bay
Lake Superior
Duluth
Superior
MICHIGAN
Michigan
Chicago
Detroit
Toledo
Cleveland
Erie
Ottawa
Montreal
Rochester
Buffalo
Boston
New York
Pittsburgh
Baltimore
Washington
Norfolk
Atlantic Ocean
Middle Island Point
Grand Island
Marquette
Ishpeming
Negaunee
Marquette Iron Range
Munising
Miner's Castle
Pictured Rocks
Tahquamenon Falls State Park
Sault Ste. Marie
Sault Ste. Marie
ONTARIO
Newberry
Seney
UPPER PENINSULA
Manistique River
Iron Range
Iron Mountain
Gladstone
Escanaba
Manistique
Mackinac Island
Mackinaw City
Cheboygan
Bois Blanc Island
Beaver Island
Grand Traverse Bay
Burt Lake
Petoskey
Rogers City
Lake surface 580 feet above sea level
Blind River
St. Joseph Island
North Channel
Drummond Island
Manitoulin Island
Cockburn Island
Hammond Bay
Indian River
Ocqueoc River
Alpena
North Point
South Point
Hubbard Lake
Hartwick Pines State Park
Au Sable River
Tawas City
Au Sable Point
Pte. Aux Barques
Harbor Beach
Bad Axe
Saginaw River
Bay City
Caro
Saginaw
Chesaning
Flint
Port Huron
Sarnia
Pontiac
Birmingham
Detroit
Windsor
Lake St. Clair
Belle Isle
Lake Erie
Pelee Island
Toledo
Sandusky
Fremont
Menominee
Marinette
Oconto
Washington Island
Sleeping Bear Sand Dune
Glen Haven
Leelanau Peninsula
Old Mission Peninsula
Traverse City
Gaylord
Sturgeon Bay
Green Bay
Frankfort
Manistee
Cadillac
Houghton Lake
Grayling
Roscommon
Higgins Lake
Manitowoc
Big Sable Point
Ludington
Pere Marquette River
Sheboygan
Little Sable Point
Big Rapids
Mt. Pleasant
Midland
Standish
Hope
Alma
Muskegon
Lake surface 580 feet above sea level
Milwaukee
Grand Haven
Grand Rapids
Racine
Kenosha
Holland
Lansing
East Lansing
Great Lakes Naval Training Station
South Haven
Kalamazoo
Battle Creek
Oliver
Ann Arbor
Ypsilanti
Jackson
Albion
Portage
St. Joseph
Benton Harbor
Dowagiac
BERRIEN COUNTY
Niles
Coldwater
Hillsdale
Adrian
Willow Run
Dearborn
Wyandotte
Monroe
Evanston
Chicago
Cicero
Hammond
Indiana Harbor
Gary
Elkhart
South Bend
INDIANA
Bryan
OHIO

**Ice Packed by an April Gale Traps 28 Ships in Lake Superior's Whitefish Bay**

Ship jams used to be common, but icebreakers, ship-to-shore radio, and regular weather reports make them rare today. These carriers keep steam up for quick starts when the pack opens up.

© The Detroit News

**Frozen-in Vessels Suggest an Explorers' Convoy Locked in the Antarctic**

Rafted floes have studded Whitefish Bay as late as mid-May. Ice in December, 1926, pinched 247 ships in St. Marys River; sellers drove food-laden sleds up to ships' sides. So much wheat was tied up that markets grew panicky.

"Wolverine skins were so numerous in these shipments that eastern buyers, having no way of knowing that most came from beyond Michigan, called it the 'Wolverine State.' The nickname stuck in defiance of the facts."

East Lansing, next door to the capital city, hustles to keep step with its pride, joy, and meal ticket, Michigan State College, oldest land-grant agricultural college in the United States. Of its co-educational enrollment of about 15,000, four-fifths are native Michiganders.

Back in 1855 students built Michigan State's first building out of bricks they made themselves. It was the first agricultural college building in the country.

State's faculty, led by President John A. Hannah, teaches in eight main schools. Most courses offer graduate degrees. So Michigan State actually is a great university; it keeps "College" in its name to avoid confusion with the University of Michigan.

At the college's Agriculture Hall I called on Ernest L. Anthony, Dean of the School of Agriculture.

"Partly by accident," Dean Anthony told me, "this is an ideal spot for an agricultural school. From the area within 125 miles of East Lansing comes more than four-fifths of our State's farm income."

Ancient glaciers, I learned, strewed Michigan with morainic deposits. They run the gamut of soil types. On the 3,000-acre College Farm, 27 kinds of soil challenge agronomists.

### Mucklands Become "Black Gold"

For decades Michigan's wet, black mucklands frustrated farmers. Drainage finally converted them from soggy wastes into "black gold"; 5,000,000 muckland acres now produce millions of dollars' worth of celery and onions every year.

Acreage still is under development, but a specially evolved muckland blueberry in 1950 yielded one-and-a-quarter million dollars from only 1,500 acres!

Dean Anthony has charge of this plant-breeding research at State agricultural experiment stations.

"We're mighty proud, too, of our Haven peaches, developed for the sandy soils of the Lake Michigan fruit belt," the Dean told me. "Four of the Haven varieties account for 55 to 60 percent of Michigan's great crop of choice table peaches.

"Our experimenters have found that today's 'wonder drugs,' effective in treating humans, promise equally dramatic applications to agriculture," said Dean Anthony. "Each year dairy farmers discard good heifers because of failure to breed. Now our research scientists find that proper hormone treatment causes sterile heifers to give milk without calving.

"Other tests by our Agricultural Experiment Station show that pigs gain 40 percent more weight when antibiotics and vitamins are added to the basic ration," Dean Anthony explained.

### Source of Cherries, Beans, Sugar Beets

Not a leading agricultural State, Michigan nevertheless stands yearly in one of the first ten places among the 48 States in 30 farm products. In 1950 it ranked first in navy beans, fourth in sugar beets, fifth in dried milk, seventh in dairy products, second in peaches, first in red tart cherries—and so on (page 304).

Michigan grows practically all the United States' chicory and wormwood. Most of the chicory is blended with coffee in Louisiana; oil of wormwood is used in medicines.

State Route 78 led me northeast from Lansing to Flint, Michigan's third largest city, made rich by the automobile industry. Nine-tenths of Flint's industrial population works in General Motors Corporation plants—the Buick and Chevrolet Divisions, two Fisher Body factories, and the AC Spark Plug Division.

Northward from Flint productive farm lands, shaped like a crescent moon, curve inland from Saginaw Bay. Newly planted bean and beet fields reached on either side to flat horizons.

Between Saginaw and Bay City, humming industrial towns, the road paralleled the Saginaw River. Placid now, the stream knew tip-roaring action 80 years ago when red-sashed lumberjacks urged pine logs down its current (page 304).

During the '70's and '80's Bay City's whining sawmills lined both riverbanks for miles. The smell of fresh-sawn lumber "was strong enough to flavor food." Lumber piles made wooden walls along the Saginaw.

Upstate from Bay City, wilderness still crowds close. Pine and spruce walled the roadsides as I drove north to Roscommon, headquarters of Region II of the State Department of Conservation. The Department is responsible for Michigan's natural resources.

Charles F. Welch, regional education supervisor, took me to visit George A. Griffith, Conservation Department commissioner, at his Au Sable River home. On the way we counted a dozen deer.

Game and fish were subjects of our talk.

"From our hatcheries," Mr. Griffith said, "we're planting over a million legal-size trout every year. That points up the pressure on our streams; yet fishing still is excellent—

© National Geographic Society  Kodachrome by Andrew H. Brown

Blooms, Wooden Shoes, and Windmill Say It's Tulip Time in Holland, Michigan

## Did a Million Attend the 75th Tulip Festival at Michigan's Holland

[illegible]

**Ships on the St. Clair River Glide in Endless Procession Past a Tranquil, Cottage-lined Lagoon**

St. Clair and Detroit Rivers, connecting Upper Great Lakes [illegible] Michigan [illegible]

## Dorm Galleries Admit Michigan Students to Angell Hall

[illegible]

[illegible] Angell Hall [illegible] Michigan [illegible] Angell Hall [illegible] Ann Arbor [illegible]

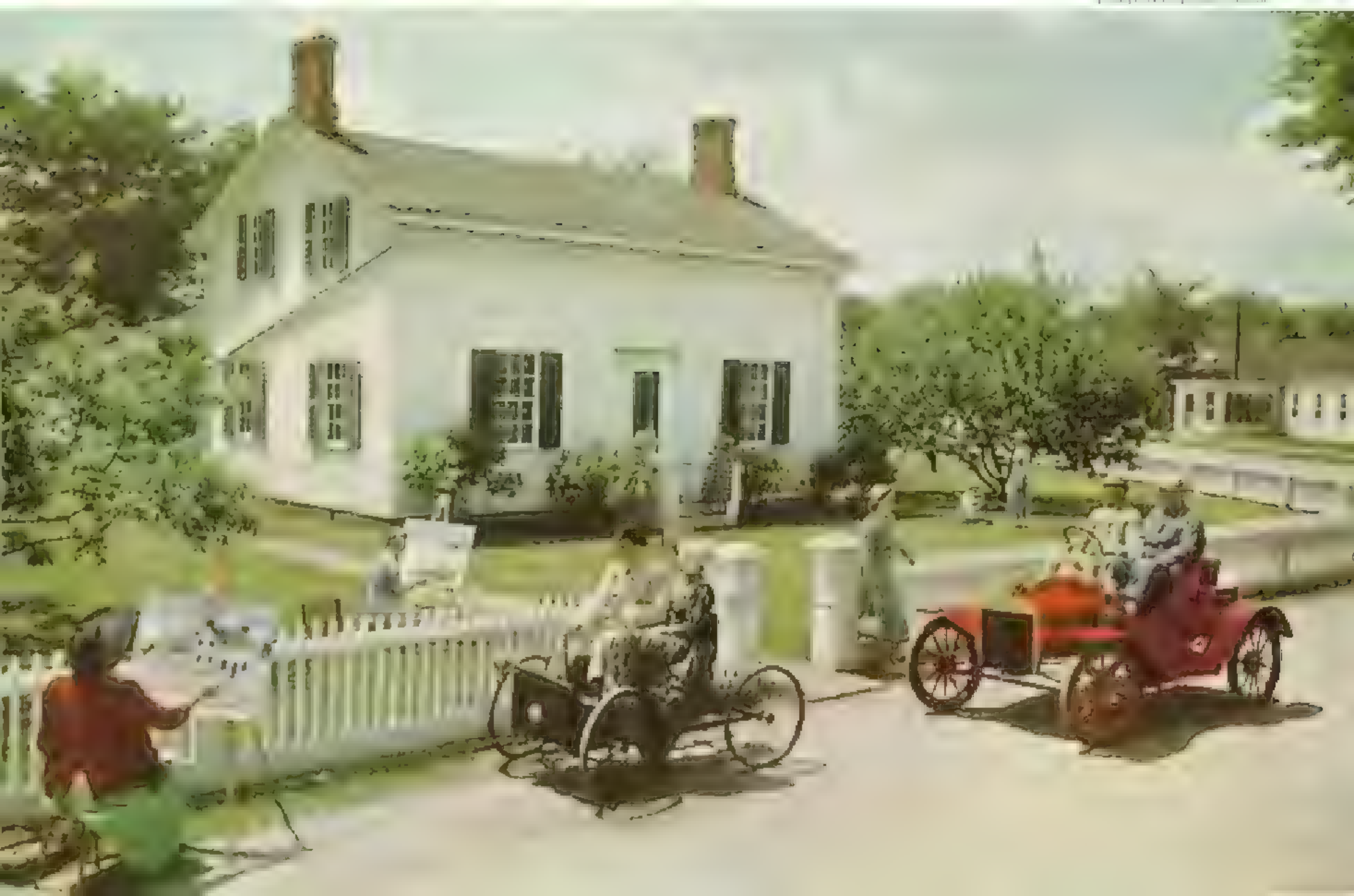
[illegible] Angell Hall [illegible] Michigan [illegible] Ann Arbor [illegible] Angell Hall [illegible] Ann Arbor [illegible]

[illegible] Angell Hall [illegible] Ann Arbor [illegible] Angell Hall [illegible] Ann Arbor [illegible]

[illegible] Angell Hall [illegible] Ann Arbor [illegible] Angell Hall [illegible] Ann Arbor [illegible]

[illegible] Angell Hall [illegible] Ann Arbor [illegible] Angell Hall [illegible] Ann Arbor [illegible]

Awesome Steamer Past Stephen Foster's Home (Left). Both Are Attractions in Greenfield Village, Henry Ford's Dearborn Museum



**Michigan a Century Ago Built Its Capital in a Wilderness. Look at Lansing Now!**

[illegible]

if you know your stuff. These old browns and rainbows are fly-wise and crafty!" (Page 307.)

Mention of fish sent Griffith to his home freezer. He pulled out three rainbows and fried them for us as we talked.

"Venison from the freezing locker is mighty tasty, too," Welch put in, "but it's a tough job keeping deer plentiful. The hunter wants his buck. And of over 125,000 Michigan deer shot in 1950, resident hunters killed more than 118,000."

### Hunting the Hard Way—with Arrows

Bowhunting has taken firm hold. In 1951 nearly 20,000 game seekers in Michigan were armed with bow and arrow. One out of every ten got his buck. The archer must get within 60 yards—and preferably nearer 30—of the deer to have much hope of a kill.

Grayling straddles the upper waters of the Au Sable River. Its clear, cool waters now sweep fishermen, instead of logs, from pool to pool in canoes and native longboats. Each September canoeists from all over the United States and Canada race nonstop the length of the winding Au Sable, some 200 miles, in the grueling Michigan Canoe Championship.

On a summer afternoon I floated down the Au Sable, idly flipping a fly into eddies and beside snags. Some stretches of the stream were wild; at choicest sites bungalows and cottages peeped from pine groves or clung to the riverbank (page 305).

At the helm was conservation officer Clarence Roberts. Without effort, he did three things at once: poled and steered the canoe with a sawed-off broom handle; cast a dry fly with unerring accuracy; and chatted about river people, poachers he'd nabbed, angling lore, and his two sons.

We caught two trout—a small brook and a nice brown.

North from Grayling to the Straits of Mackinac the road wound through logged-over lands, past swamps and pretty lakes, through few towns. Then the land dropped away, farms appeared, and silvery Burt and Mullett Lakes called a halt for admiration.

From neat Cheboygan on Lower Peninsula's tip I turned southeast to Hammond Bay to visit scientists studying the murderous sea lamprey (*Petromyzon marinus*).

### The Lamprey, Fish Enemy No. 1

In glass aquariums lampreys hang like tentacles from trout serving as guinea pigs (page 301). At stake in these researches is a $3½-4,000,000 fishery. In the battle, the U. S. Fish and Wildlife Service is collaborating with the Michigan Department of Conservation.

Between 1945 and 1949 the lake trout catch in United States waters of Lake Huron fell from 1,743,000 pounds to a scant 1,000 pounds! In Lake Michigan the drop during the same years was from nearly 5,000,000 pounds to 343,000 pounds.

The predatory sea lamprey gets the blame for this appalling decline.

Dr. Vernon C. Applegate, in charge of the Hammond Bay Fishery Laboratory, plucked an eellike lamprey from a tank and turned its grotesque mouth parts toward me. Knife-sharp teeth rimmed the creature's mouth; [illegible]

With this razor-edged arsenal the lamprey, about 17 inches long when adult, attaches to a fish, rasps through scales and skin, and sucks out its victim's lifeblood and vital juices.

The sea lamprey, infesting the upper Great Lakes through canals, has traded its fresh-and-salt-water life for a completely fresh-water existence. Lake trout and whitefish have been its favorite game, but all other species, too, are attacked.

"The problem is to keep the lamprey from spawning, or to destroy its young in the streams," said Dr. Applegate. "Lampreys ascend streams to spawn in spring and early summer. The young lampreys stay in the streams about four years, then drift down to the Lakes."

Applegate showed me experimental control works on near by Ocqueoc River. Rows of metal posts spanned the stream. Wires led from power poles on the bank to the posts nearest shore.

### A Shocked Lamprey Turns Away

"This is a 'shock treatment' fence," Applegate explained. "During the lamprey run we shoot a 110-volt AC current into these electrodes. Current flows through the water between the aluminum posts. The 'hot' water stuns or otherwise repels the lampreys. This method is close to 100 percent effective. At this point we stop between 18 and 25 thousand sea lampreys each year."

Applegate pointed out that one man can tend several electric weirs. But costs must still be pared before widespread installation can be justified.

The sea lamprey, I learned, spawns about 61,500 eggs. Adults of both sexes die after spawning.

Lampreys have attacked swimming humans, but they don't hang on very long. One theory is that man's skin is distastefully warm to the greedy creatures.

Between Mackinaw City and St. Ignace, ferries linking Michigan's two peninsulas ply the Straits of Mackinac all the ice free months.

## Michigan Honors Its Heroic Dead in the State Capitol

[illegible]

## An Animal Portrait by George Stirras

[illegible]

Twin Fawns Stop to Attention at the Photographer's Whistle, Flash Powder Lighted This Scene in the Michigan Wilderness

**Mackinac, Making Medicines, Serves the Nation's Health**

[illegible]

Other boats soon started Mackinac Island, [illegible]

On the voyage to Mackinac Island [illegible] into [illegible] of Old Fort Mackinac [illegible]

[illegible] Mackinac Island [illegible] No automobile [illegible] Mackinac Island [illegible] the trail and [illegible] vehicle. On the [illegible] aspect of the [illegible] more [illegible] and [illegible] competent [illegible] all [illegible] put together, the [illegible] problems are [illegible] With [illegible] officers [illegible] and hundreds of [illegible] enlisted [illegible] and [illegible], but [illegible] range [illegible] — [illegible]

[illegible] Grand Hotel [illegible]

glorious [illegible] We [illegible] hours of [illegible] water, under [illegible] trees and [illegible] Blossom. No [illegible] in [illegible] peaceful setting of the half forgotten [illegible] that this little island once was [illegible] with [illegible] shells and stripped with [illegible]

Old Fort Mackinac [illegible] below its walls are [illegible] where that [illegible] early French explorer—Nicolet, Allouez, Marquette and La Salle.

## Americans Cornered the Fur Trade

The British, victorious in the French and Indian War, fortified Mackinac Island. After the Revolution Mackinac was [illegible] to America, but the British did not evacuate it until 1796. In the War of 1812 they retook it by stealth before war or the news of peace had reached the Yankee garrison. The British were [illegible] an American assault, but withdrew from Mackinac under the terms of the Treaty of Ghent.

The Americans backed into [illegible] for [illegible] in 1817 from Jacob Astor, [illegible] the operation [illegible] by Astor [illegible] Mackinac.

The Astor [illegible] [illegible] years [illegible] of pelts in a [illegible] year, 1822.

Although its heyday was a [illegible] past, Mackinac [illegible] French [illegible] adventure. As the French as many as [illegible] Indians used to come at once, four wigwams high and three rows deep.

After [illegible] in the [illegible] of 1864 the greater part of the island became a State park.

Old Fort Mackinac's most [illegible] interest to me lies in the memories it [illegible] Wolverine Department. American soldiers at [illegible] last [illegible].

In 1822 Department [illegible] Mackinac [illegible] French [illegible] outposts [illegible] by an accidental gunshot

**Painstaking Hand Labor Makes Grand Rapids' Name a Synonym for Fine Furniture**

[illegible]

[illegible] Hence [illegible] Bureau [illegible] Upper Peninsula [illegible] the "U.P."

[illegible] Mackinaw City, I picked up my car [illegible] the Straits ferry to St. Ignace [illegible] Upper Peninsula [illegible] the "U.P."

[illegible] Mary's French for "St. Marys [illegible] Michigan [illegible] Ontario [illegible] St. Marys River [illegible] Lake [illegible] a [illegible]

Here at the world's largest [illegible] a strategic stop—I found the word-of-the-day was "Fortification." No [illegible] [illegible] of the [illegible] area. Women [illegible] [illegible] posts.

[illegible] vessels including main boats and tankers, [illegible] [illegible] locks [illegible] only Indian [illegible]

[illegible] Michigan [illegible] Minnesota and Ontario [illegible] Canada and the Great Lakes [illegible]

[illegible] the Soo locks [illegible] Lake Superior and Sault Ste. Marie [illegible]

Yet ice closes the giant water elevators about 120 days each year!

Westward from the Soo across the U.P., I drove through almost continuous forest to Munising, jump-off point for Pictured Rocks. Cliffs on the Lake Superior coast have been wondrously carved into pinnacles and caves that echo the waves' thunder.

From the promontory of Miner's Castle I watched sunset gild a wide sweep of cliffs and send shimmering lights across Lake Superior (page 315).

Here most particularly I felt the spell of Gitche Gumee, the Big-Sea-Water of Hiawatha. Michigan's Upper Peninsula provided most of the setting of Longfellow's *The Song of Hiawatha*. The poet mentions ". . . the Pictured Rocks of sandstone, looking over lake and landscape."

On 13,000-acre Grand Island off Munising the late George Shiras 3d made many of his extraordinary night photographs of wildlife, first of their kind. He took dramatic pictures of deer, bear, moose, and other wildlife all over northern Michigan (page 297). In quest of game portraits, he explored Isle Royale, Michigan's island outpost in Lake Superior, now a national park.*

### Marquette, Gateway to Iron Country

Marquette, midway along the north shore, lies at the threshold of Upper Peninsula's iron country. The landscape changes, level woodlands and sandy soil giving way to terrain wrinkled into hills, ridges, and gorges.

Marquette occupies a key position in Michigan commerce. Marquette, and Escanaba 60 miles to the south on Lake Michigan's Green Bay, are the State's two great iron-shipping points. Thirteen percent of United States iron comes from Michigan mines.

The bulk of Marquette-shipped iron ore comes from underground mines at Negaunee, Ishpeming, and other mining towns on the Marquette Range. This is the easternmost of Michigan's three producing regions, the Marquette, Menominee, and Gogebic Ranges.

At the Presque Isle ore dock of the Lake Superior & Ishpeming Railroad Company, one [illegible] Marquette docks, I boarded the S.S. *John Stanton* of Indiana Harbor, Indiana. Mate Waldo Kirk walked me past her 40 loading hatches. Talk was cut as hematite ore poured with a roar down steel spouts into the hold. The *Stanton* can take 10,000 tons in as little time as two-and-a-half hours.

To help meet the Nation's steel hunger, Michigan's ore-loading ports in 1951 neared all-time records for iron ore shipped, a year-end estimate showed 13,750,000 tons moved.

From offices of Cleveland-Cliffs Iron Company at Ishpeming Jack Bowen of the company's welfare department drove me to the near-by site of the first iron mine in the whole Lake Superior district.

### Meeting a "Cousin Jack"

At the Mather Mine, A shaft, we watched miners scramble off the lift cage at the end of their shift. Bowen stopped a man of rugged build and introduced him to me.

"This is Billy Richards," said Bowen, "one of our miners whose ancestors came from Cornwall, in the southwest of England."

Cornish miners are known locally as "Cousin Jacks." Topnotch men underground, their forebears came to Michigan when Cornwall's tin mines petered out.

At Ishpeming I looked up Walter F. Gries, superintendent of Cleveland-Cliffs welfare department.

"Ever hear of a Cornish pasty?" (Gries pronounced it "pass-tee.")

"Never have," I answered.

"Well, the pasty helped build this country. Come home with me and I'll have Mrs. Gries make you one."

Mrs. Gries let me kibitz as she rolled out four pieces of dough to dinner-plate size. On half of each dough disk she piled potatoes, turnips, onion, cubed beef, and pork. Liberally seasoned, each structure was topped with a walnut-size chunk of butter.

Then Mrs. Gries folded over the dough and crimped the edges of the half-moons. Slit at the top, the pasties went into a hot oven for an hour. The steaming pasties were the backbone of a feast rounded out with a green salad, chowchow, and strong tea.

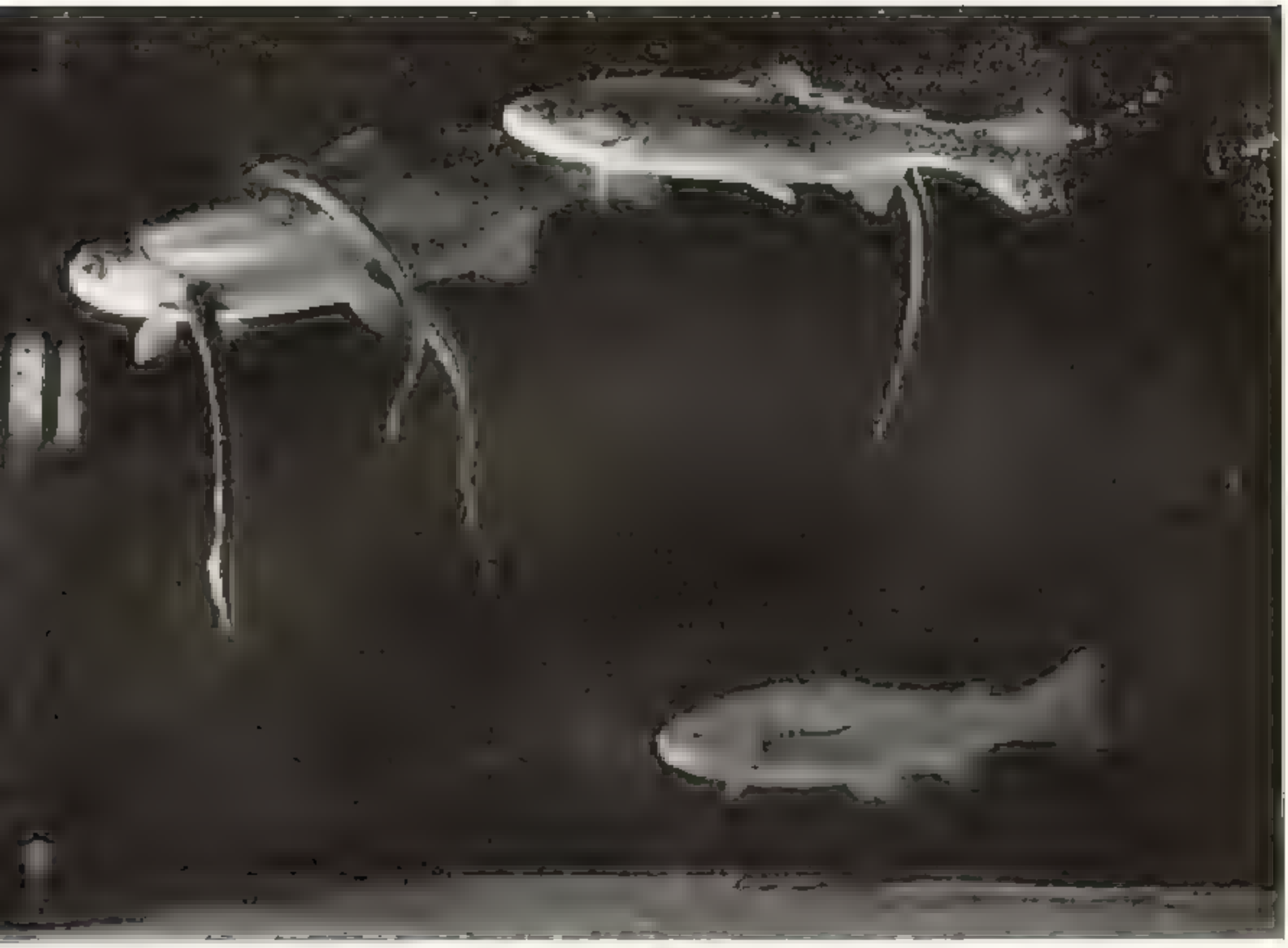
Upper Peninsula's iron and copper mines, and lumbering, attracted not only Cornishmen but also Finns, Swedes, Irishmen, Italians, and French Canadians. Their dialect stories are part of local folklore.

On Finnish farms and in small towns where Finns predominate, the home-country *sauna*, a bath in steam generated by pouring water over hot rocks, still is used.

West and north from Marquette, U. S. Route 41 led me to the hooked claw of Keweenaw Peninsula, Michigan's Copper Country. This district has produced, to date, nearly 10 billion pounds of the ruddy metal. About a seventh of all copper so far mined in the U. S. has come from Michigan.†

* See, in the NATIONAL GEOGRAPHIC MAGAZINE, by George Shiras 3d: "Wild Life of Lake Superior, Past and Present," August, 1921; "Wild Animals That Took Their Own Pictures by Day and by Night," July 1914; "One Season's Game-Bag with the Camera," [illegible] "Photographing Wild Game with Flash-[illegible]" [illegible]

† See "Rockbounds' Uncovet Mineral Beauty," by [illegible] Saitzer, NATIONAL GEOGRAPHIC MAGAZINE, [illegible] 1951.



**Bloodsucking Lampreys, Hanging On Like Leeches, Kill Trout by the Million**

[illegible]

Thousands of years before white men came, some unknown people worked Keweenaw's copper veins. Scientists could find little else. Yet recent geological finds point to the Vikings and Lapps coming to the Arctic and Keweenaw!

Copper mining on the scale needed its peak in the mid 1917. Later, [illegible] and rather [illegible] elsewhere [illegible]

## To a Miner a Strike Is a Strike

North of U. S. 41 from the twin cities of Hancock and Houghton, in a remote rural part [illegible] aggressive union [illegible] work [illegible]

At Calumet, W. J. Nesbitt, director of industrial relations of Calumet and Hecla Consolidated Copper Company, [illegible] the mine [illegible] days of the century. Calumet and Hecla stock sold for $1,000 a share.

Mr. Nesbitt [illegible] for the death of [illegible] last miner [illegible] strike of [illegible].

This [illegible] allow [illegible] to his first [illegible] bosses all gone. Confronted by [illegible] he began [illegible] "Strike one, strike two" [illegible] "Strike three, you're out!"

The [illegible] Then, as the [illegible] "I'm yellow wet and [illegible] over head by the strike fever! You [illegible] Dear [illegible] Is the Copper Country where I grew [illegible] and [illegible]"

The coast of Keweenaw Peninsula [illegible] country [illegible] River and [illegible] a pleasure land of blue waters, copses of [illegible] maple, white and [illegible], and [illegible] evergreen [illegible] Spruce, Fir and Pine.

[illegible] Eagle Harbor [illegible] Brockway Mountain Drive [illegible] with wild flowers. From Brockway Mountain [illegible] Lake Superior [illegible] Bay, planted the [illegible] Lake Superior.

Heading back toward Lake Superior I drove [illegible] Marquette.

* [illegible]

Paper and pulp mills abound in Michigan. At Escanaba and Manistique, for example, mills of the Mead Corporation turn out not only familiar magazine stock but also target paper for the armed forces, "hanging paper" (wallpaper, before printing), and smooth stock for children's books, coloring tablets, and paper dolls.

### South Along Michigan's Riviera

The Straits of Mackinac recrossed, I turned my car south along Lower Peninsula's Lake Michigan coast.

The 300 miles of Lake Michigan shores from Petoskey to the Indiana border form Michigan's own "Riviera." In the north, bays flecked with sails indented hilly land. Long lakes of crystal translucency enhanced green farm lands.

Up from shores of Grand Traverse Bay matched ranks of cherry orchards; this region is an American "cherry bowl."

In Traverse City, during the mid-July National Cherry Festival, I was quick to enter a restaurant and order cherry pie, and to lie on the log stating I'd eaten it. [illegible] Loud-speakers broadcast the proceedings, which made examples of the "guilty."

Coronation of the Cherry Queen—1951's winning choice was beautiful Mary Lynn Trapp—climaxed three days of parades, fireworks, and carnival fun.

On Old Mission peninsula, at the farm of David Murray, I watched pickers nimbly relieving cherry trees of their bright burden and pouring the red fruit from pails into wooden crates. Ninety percent of the Grand Traverse Bay region's 2,000,000 cherry trees bear red tart (sour) cherries, canned and frozen for pie filling, toppings, jams, and jellies.

Entering Leelanau peninsula, I ranged the little finger of palm-shaped Lower Peninsula, which matches its more prominent eastern thumb. Bright hues of green and blue marbled the surface of Glen Lake, separated from Lake Michigan by Sleeping Bear Sand Dune.

Louis Warnes of Glen Haven shows off the dunes from open stock cars with oversize tires. In these Sleeping Bear Duneswobbles, Warnes's drivers sell thrills aplenty as they speed over wind-rippled sands (next page).

I clutched hardware and upholstery of one of Warnes's wheeled jack rabbits, as a driver "wrung it out" on sand ridges, hairpin turns, and flats taken at full throttle. This "dune scooting" was real sport!

Cresting several hundred feet above Lake Michigan, the dunes command glorious views. Sparse grasses cling to the drifts. Pockets shelter ghost forests, their spectral trunks drowned by shifting sands.

Near Muskegon I returned to south Michigan's farm-and-city pattern. Muskegon, with a rugged past in the "roaring eighties," employs descendants of its old-time millhands and lumberjacks in factories turning out motor castings, office equipment, textiles, leather products, and many other items. One hundred and sixty manufacturing plants make $350,000,000 of goods a year (page 320).

On I rolled to Grand Rapids, once just the name of a frothing stretch of Grand River. Today, synonymous with fine furniture, it's Michigan's second city, after Detroit.

During lumbering days, river drivers' calked boots ground the town's boardwalks into matchwood. One hotel proprietor required lumberjacks entering his hostelry to exchange boots for carpet slippers. He provided the slippers.

### A Natural Furniture Town

Close to wood, water power, and water transport, Grand Rapids even before modern roads and railroads was a natural site for furniture manufacture. Surviving the ebb and flow of taste and technique, the city still is style leader in the American furniture trade.

Seventy-seven factories in Grand Rapids turn out, not more furniture than any other locality, but far more of top quality. The city has the country's largest colony of furniture designers (page 299).

At Johnson Furniture Company, Earl M. Johnson took me to the stock room. Choice veneers breathed the aroma of far places—of Africa's Gold Coast, European wild pear groves, and rain forests of Nicaragua and Honduras. Then we followed production from cutting to finishing. Between rough wood and finished piece, what a transformation and what dependence on skilled hands!

Many Johnson craftsmen (as in all Grand Rapids firms) were Hollanders: Grand Rapids, with America's largest Dutch colony, is 25 miles from Michigan's own Holland (pages 287, 288, 289).

Excitement reigns during Grand Rapids's semiannual furniture markets. Held yearly since 1878, they constitute the Nation's oldest merchandise mart.

Still southbound I, I drove on to Battle Creek, the setting of a great success story. Battle Creek tells the tale of two names familiar at nearly every American breakfast table.

The imagination and daring of John Harvey Kellogg, W. K. Kellogg, and C. W. Post made Battle Creek and the names Post and Kellogg bywords for breakfast foods and physical well-being. The health conscious city still is keyed to promotion of human fitness that the

**Sleeping Bear Dune's Sandy Ramps Slope Down 600 Feet to Lake Michigan**

These golden shores, a playground for sun bathers and hikers, form Michigan's [illegible] Riviera. These women have just enjoyed a full-throttle roller-coaster dunes ride on the steep [illegible]

A Still Scientists Weigh His Crops on Test Plots near Greenville

Michigan State College scientists are still [illegible] weighing the crops in experimental plots near Greenville. Here [illegible] Michigan Farmer Photo

B Big Wheels Straddled and Lifted Low for Summer Handling

Minnesota farmers use home-made [illegible] to straddle and lift low-set crops. Here [illegible] Photo by Minnesota Farmer

**Tireless Fisherman or Wary Trout: Which Loves the Swift As Subtle the More?**

[illegible]

**Speedboat and Aquaplane Flash Past Sun Bathers Beside Indian River**

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## Water Entering Boat Aeriduct Keeps Penned Trout Alive

[illegible]

## In Comes a Steamer to Mackinac Island

[illegible]

[illegible]

[illegible]

**Horses Do a Thriving Business; Machines Island Have Their Automotive Competitors**

[illegible]

Schools Out for the Summer: Children Play on Higgins Lake

Both children are from Michigan State [illegible]

Upper Peninsula's Huck and Tom Fish from a Homemade Raft

Some Michigan [illegible]

# A Great Lakes Carrier Hauls 14,000 Tons of Iron Ore Down St. Marys River to Spread the Nation's Revitalization

**Lake Superior Waves Carved the Helmeted Giants: Sunset Glints the Painted Rocks**

[illegible]

## S. S. *Prader*, Running Ashore, Has Stayed on Land 28 Years

## Intermittent Falls Trickles 90 Days in Heavy Rains

[illegible]

## Detroit's Children's Zoo Encourages Youngsters to Make Friends of Animals

[illegible]

local radio outlet is Station W-E-L-L, Battle Creek.

The story goes back to 1866, when the Seventh-day Adventist Church moved headquarters from Rochester, New York, to Battle Creek. (Later it shifted permanently to Washington, D. C.)

The Adventists, in their teachings, stressed temperance and health reforms; local roughnecks, sneering at them as fanatics, called them vegetarians.

### Cereal Success Story

John Harvey Kellogg, a year out of medical school, took charge in 1876 of the Adventists' Western Health Reform Institute, presently renamed Battle Creek Sanitarium. Kellogg [illegible] but found time to invent useful medical and surgical appliances, develop the electric-light treatment, and experiment with novel diets.

The machines and methods for food processing developed by the Kellogg brothers founded modern dry-cereal and nut-food manufacture.

A young salesman and farm machinery builder, C. W. Post, benefited from treatment at the Battle Creek Sanitarium. His La Vita Inn, opening in the city in 1891, catered to people in delicate health. Post's warm cereal drink, Postum, was phenomenally popular. A line of breakfast foods followed.

Post's mushrooming factories were models of cleanliness and sanitation; he subsidized homes for employees. Post was among the first to exploit advertising on the grand scale; his annual promotional budget reached a million dollars. Post cereals swept to success, C. W. Post became a multimillionaire.

W. K. Kellogg, John Harvey's brother, meanwhile built up the Kellogg Company dry cereal firm, starting with Kellogg's Corn Flakes, then and now the largest-selling of all ready-to-eat cereals. So the Kellogg Company achieved world leadership in the field.

In 1930 the W. K. Kellogg Foundation was established at Battle Creek to promote health, education, and welfare through programs undertaken in many countries. By late 1951 the Foundation's outlay for good works totaled $46,000,000.

Today in Battle Creek a nutty-sweet aroma tickles visitors' nostrils. It's the pleasant exhalation from factories of the Kellogg Company and the Post Products Division of General Foods Corporation. In output of prepared breakfast foods, Battle Creek leads the Nation.

West of Battle Creek my route led to Kalamazoo, whose Indian-derived name intrigues poets and songwriters.

"Kalamazoo is a city surrounded by celery, bulbs, and pansies where the people, lots of them Dutchmen, keep out of trouble making pills, paper, fruit pickers, guitars, and oil of peppermint," a Michigan friend briefed me.

His analysis, though far from complete, hit high spots of the truth. Mucklands ringing the city support vast plantings of celery. In spring these fields are banded with pansies in bloom, the flowers a rotation crop yielding extra income to the farmer.

Kalamazoo is a cornucopia of paper products. Eight paper mills rolled out more than 400,000 tons of paper in 1950 in a wide variety of finished forms, from boxes and cartons to printing papers, labels, wrappers, and food protective papers.

Sixty-seven years ago the Upjohn Company was founded in a Kalamazoo basement to make patented pills. Now a giant in the pharmaceutical field, Upjohn makes more than 700 different products in its new Portage plant six miles from downtown Kalamazoo. Vitamins, hormones, antibiotics, and a variety of powders and ointments are produced in incredible volume (page 298).

### Berryin' in Berrien

Driving west and south from Kalamazoo, I plunged into fruit-growing country, striped and checkered with peach, apple, plum, pear, and cherry orchards. Berrien County is one that, in addition to these tree crops, grows highbush blueberries.

"So in the summer," as a local wag put it, "we go berryin' in Berrien!"

At the plant of Simplicity Pattern Company, Inc., in Niles, vice president Henry A. Herzig showed me through the world's largest ladies' dress-pattern firm, essentially a vast photoengraving and printing shop. Ten presses were making 2,000 impressions every hour on tissue fabricated in the same plant.

Pattern use is growing at speed. American home sewers in a recent year bought an estimated 105 *million* patterns, which was more than twice the number they bought in 1939. Sixty million were Simplicity patterns.

In shady, restful Dowagiac, typical of Michigan's pleasant smaller cities, my cameras-flash equipment failed. My outfit was utterly strange to the electrician in a local radio repair shop. Yet praise be to small-town artisans—in 15 minutes it was fixed!

Pride in workmanship likewise was a keynote at James Heddon's Sons fishing-tackle plant in Dowagiac. Heddon's makes beautifully finished bamboo and glass fishing rods and a kaleidoscopic array of fishing plugs and baits. Heddon's was the first tackle maker to market an artificial plug, in 1898.

Many years ago, founder James Heddon tossed a whittled piece of wood into Dowagiac

## Guns or Butter? Pleasure Cars or Tanks? Michigan Makes Them All

[illegible]

[illegible] When [illegible] is located its least in [illegible] Detroit was a popular outlook here [illegible] and the rapid growth of [illegible] Sons. Henry's [illegible] the Minerva made the [illegible] industrial [illegible]

Across the State from Detroit [illegible] the [illegible] J. T. Wing [illegible] a fleet [illegible] on lake life in the Detroit River [illegible] in Nova Scotia for the coastal trade [illegible] Wing [illegible] border on the Great Lakes. [illegible] Wing [illegible] Marine of Great Lakes Motors. Capt. [illegible] Johnston is [illegible] of the ship [illegible] and [illegible] that tell the story of Great Lakes shipping [illegible] from [illegible] carrying [illegible]

Later, through the [illegible] of the Wing's fall [illegible] we watch [illegible] the endless procession of ships on the Detroit River.

"[illegible] on the average," said Captain Johnston. He [illegible] toward a passing [illegible] boat. "[illegible] never match [illegible] for the heavy hauling [illegible] world. Well, what would we do without [illegible]?"

Six [illegible] skippered on the varied [illegible] of the Great Lakes. [illegible] Michigan [illegible] Mighty and enduring is Michigan.

# White Magic in the Belgian Congo

## Tribesmen Mine Uranium, Run Machines, Study Modern Medicine as Belgium Trade Opens Up the Vast Colony's Resources

By W. Robert Moore

*With Illustrations from Photographs by the Author*

THE BELGIAN Congo today affords vivid proof that "darkest" Africa is becoming very bright indeed.

In this equatorial colony, noisy compressed-air drills, chiseling holes in rich ore deposits or jackhammering cliff walls on new hydroelectric dam projects, beat a more persistent tattoo than do native tom-toms.

Engineers, chemists, biologists, and physicians are making stranger magic here than ever did any tribal witch doctor. And certainly no tribal fetish of wood, bone, or fiber has affected the thought of so many persons as does the uranium ore—raw material of the atom bomb and atomic power—which Belgians are digging from mines in the southeastern province of Katanga.

On the day the Pan American Airways Constellation landed me in Léopoldville, capital of the Belgian Congo, I bumped immediately into one of the colony's big problems. My cable asking for reservations hadn't arrived, and not one of the half-dozen hotels had a single unbooked room! Fortunately, an acquaintance generously came to my rescue.

### Mineral Wealth Brings Rapid Expansion

I was to find the crowding of Léopoldville's hotels typical of conditions throughout the colony. Building is going on at a rapid rate, but it cannot keep up with expanding needs.

"When I first came to Léopoldville 40 years ago," Governor General Eugène Jungers told me later, "there were only 40 Europeans and 20,000 natives here. Now the city has more than 10,000 Europeans and 200,000 natives. Its population has doubled fast since the war."

World War II gave the colony tremendous impetus. Its strategic minerals and other raw materials were vitally needed by the Allied countries. Since the war, its momentum has kept on at an accelerated rate.

Ever-increasing quantities of copper, cobalt, tin, industrial diamonds, and other minerals are being torn from the Congo soil.

Only 75 years ago the whole Congo Basin was virtually unknown land to the Western World. Fired by Dr. David Livingstone's African explorations, Henry M. Stanley spent the years 1876 and 1877 tracing the course of the long, curving Congo River which, unique among the world's big rivers, twice crosses the Equator.* Later Stanley came back to help direct the setting up of the Congo Free State for Leopold II in 1885. The Free State has since become a Belgian colony.

This big colonial child of Belgium embraces most of the Congo Basin and reaches to the headwaters of the Nile—more than halfway across Equatorial Africa. It is 77 times the size of its parent, and larger than all our States east of the Mississippi combined.

To see what goes on here now, I traveled more than 8,000 miles by river boat, automobile, and plane (map, page 324).

I saw steamy, tropical bush, but I also traveled through wide regions of upland plateau, ranging from 3,500 feet to 7,000 feet altitude, where the equatorial sun is robbed of its sting and where colonists raise wheat, coffee, cinchona (source of quinine), and pyrethrum, whose blossoms are the base for a potent insecticide.

In the eastern part of the colony rear lofty volcanoes. Here, too, are the perpetual snows of peaks of Ruwenzori, the "Mountains of the Moon," towering more than 16,500 feet.

Even in tropical areas, large sections of forests have been slashed away to make space for huge palm-oil plantations. Europeans supervise some 365,000 acres; the Congolese harvest 119,000 acres and also raise coffee and quantities of cotton.

Impressive, too, in the Congo are the efforts the Belgians are making toward the improvement of conditions for the Congolese. Old exploitation days are gone. At mining centers, railway workshops, and in towns, good housing, hospitals, child welfare, and recreational facilities are being provided for these natives.

### Scarred Natives Now Skilled Workmen

How big a step forward this has been is best understood when one sees skilled workmen, some so near to their ancestral background that they wear tattoo markings and tribal scars, running bulldozers, operating precision metal lathes, and doing chemical and microscopic tests in medical laboratories.

One of my car drivers had a decorative scar extending vertically from his hairline to the tip of his nose, and two marks on each cheekbone.

* See "Keeping House on the Congo," by Ruth G. [illegible] November 1937.

**"Read All About It!" A French-crying Newsboy Peddles *Le Courrier d'Afrique***

[illegible] the nine-story air-conditioned Forescom Building, looks down on this [illegible] *Le Courrier* is an afternoon daily. Many [illegible] European newspapers are flown in

Tribal womenfolk, traditionally conservative, now queue up at clinics to [illegible] care for themselves and their babies. In the big hospital in Léopoldville, one of the biggest in Africa, I saw many of them in maternity and surgical wards or waiting in outpatient lines for minor treatment.

In 1950 this hospital alone received nearly 20,000 new cases—three-fourths of them native—and treated more than 560,000 outpatients.

Today medicine is being carried into rural districts by young, intelligent Congolese. At the Ecole d'Assistants [illegible] Léopoldville, I saw Belgian doctors training eager youths brought in from the Provinces. Students come for a six-year medical course after which they return to their homes as medical practitioners. Others also are trained as infirmary attendants and maternity aides.

Léopoldville, or Léo, as the Belgians often call it in their passion for abbreviation, is young. It has been the capital only since 1923 when colonial Government offices were moved here from Boma.

New post office and telegraph buildings are under construction, as is a whole new unit for housing the Governor General's offices. Everywhere along its wide business streets and residential avenues new buildings are being erected (pages 328, 344).

Attractive homes are surrounded by lush gardens, and the entire city is half hidden by luxuriant shade trees.

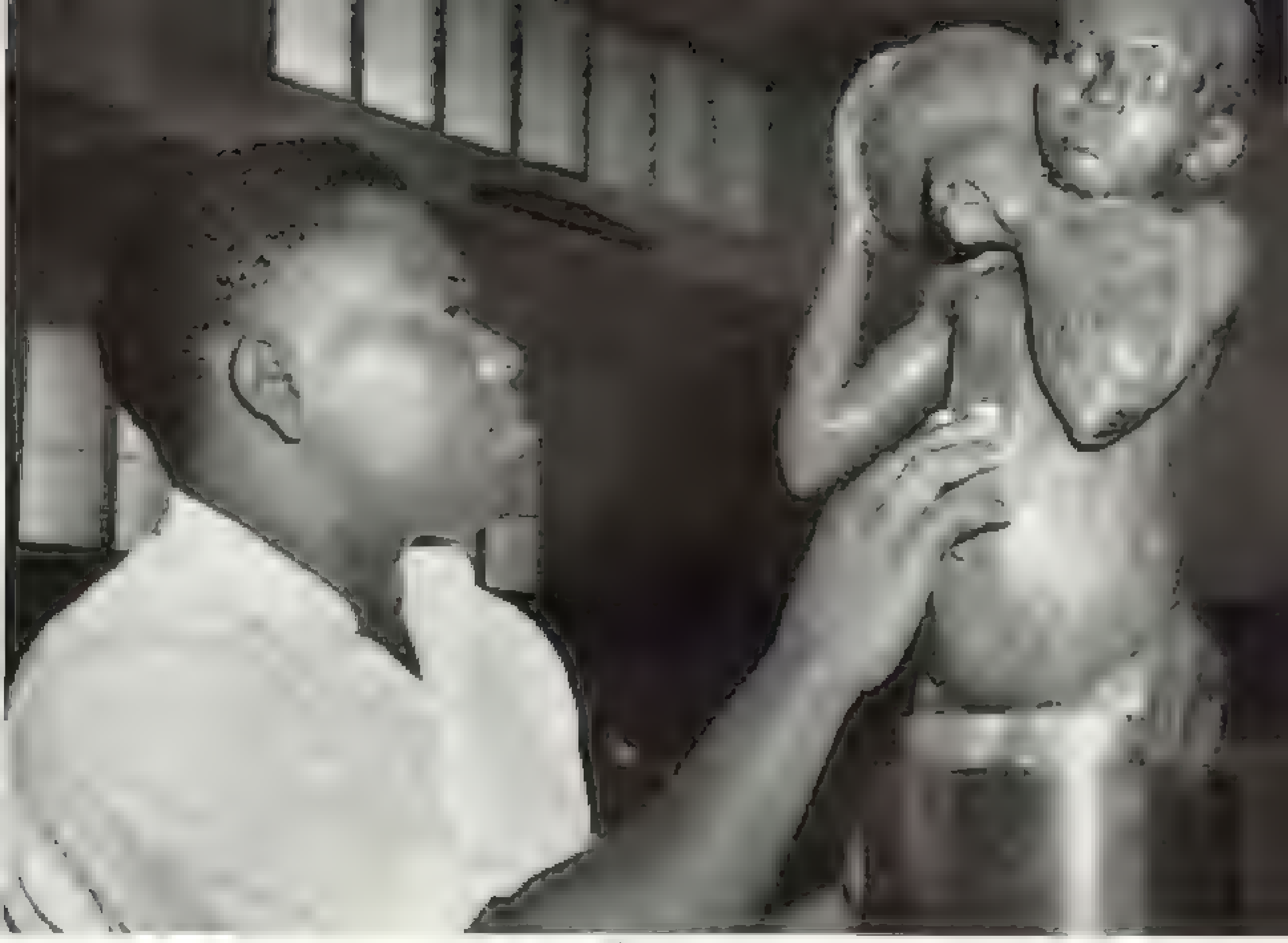
Private cars, trucks, and taxis, most of them of American make, crowd the thoroughfares. But drivers watch signals of clever police directing traffic at intersections, keep an eye out for bicyclists, and maintain courtesy at the city's circles and triangles.

To avoid midday heat and to cater to their own comfort, many businessmen and Government officials go to work early and close up shop between 12 and 2 o'clock, as in many Spanish-speaking countries.

Hotels and restaurants lend a continental flavor to the town by spreading tables on the sidewalks at sunset apéritif time.

The pleasant evening oasis on the sidewalk in front of my hotel was made even more interesting by the rows of dusky Islamic traders, garbed in white gowns and fezes, who spread out tempting displays of ivory statuettes, elephant heads, and [illegible] of crocodile-leather handbags.

Yes, I bought ivory after long bargaining!



**Skilled with His Chisels, Lufwa André Carved "The Boy with the Calabash"**

[illegible]

Leopoldville, like other [illegible] throughout the Congo, is really two separate towns, native and European [illegible].

Thousands of the Congolese work in the European section during the day and return to their own quarters at night.

Building in the native section, as in the European, has [illegible] keeping pace with increasing population. Here new housing units are going up by hundreds, new streets are being opened, and other improvements being made. [illegible] 50 and 75,000 persons [illegible] within an extensive [illegible].

## Cascades Block River Traffic at Léo

Industries [illegible] growing, but the city is essentially a distributing center, and much of its business is connected with transshipments from both the river and the rail.

Although Leopoldville [illegible] with [illegible] and automobiles and [illegible] the town [illegible] It lies some 250 miles from the ocean.

By an odd twist of geography, the more than 8,000 miles of navigable waters of the Congo and its tributaries end abruptly at Leopoldville.

Geological ages ago the Crystal Mountains were thrust up between the great [illegible] and the ocean. The river has [illegible] to cut a turbulent path through these hills to the sea. [illegible] between Leopoldville and Matadi [illegible] series of [illegible] some 800 feet over a series of cascades and [illegible] rapids.

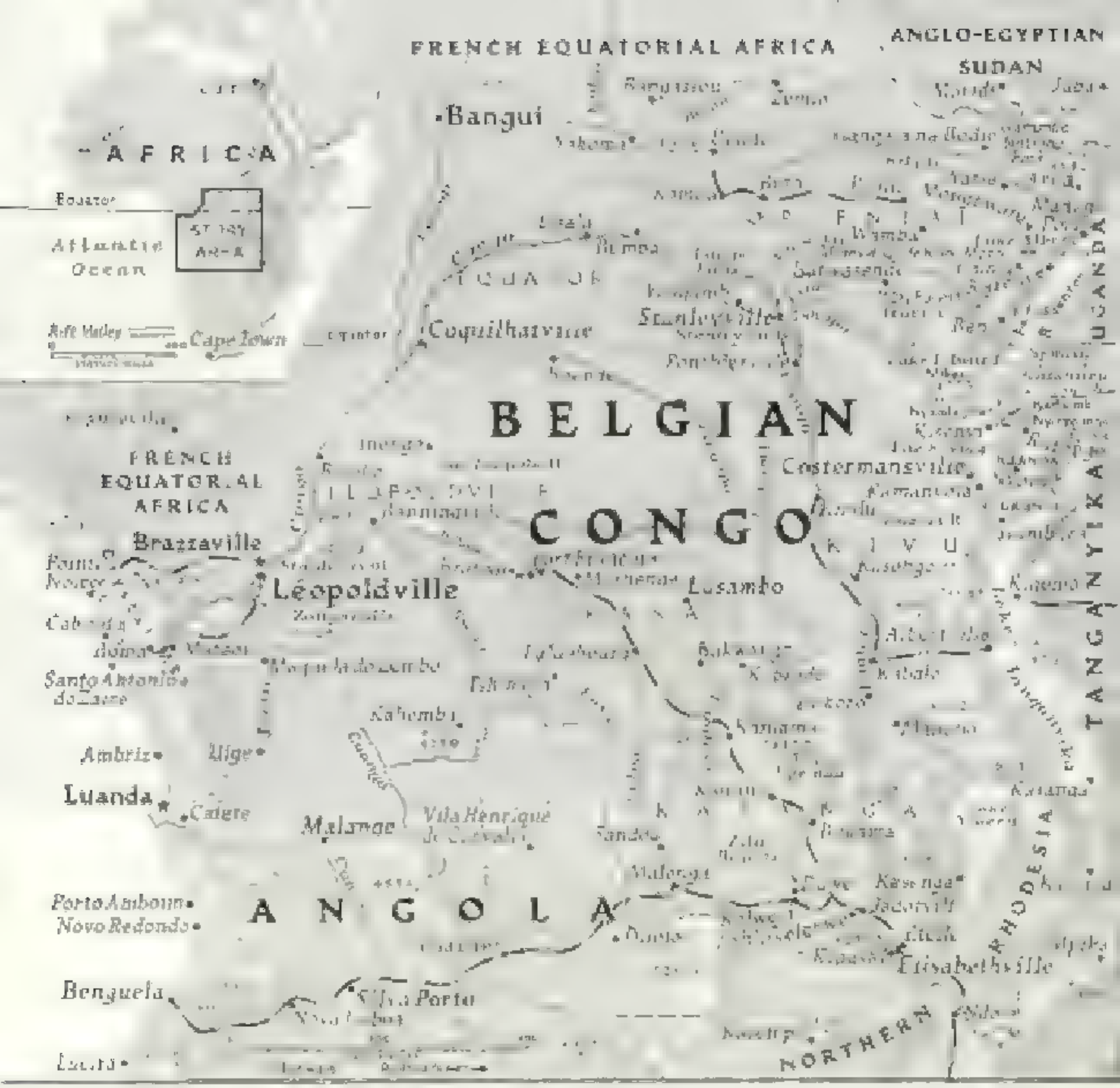
All freight moving in and out of Leopoldville has to be transported around these [illegible].

When the Crystal Mountains first reared their bulk to bar the river, they helped create a [illegible] where Leopoldville now stands. With [illegible] the wide spread of the river, called Stanley Pool.

In the broadest part, Stanley Pool is some 15 miles wide, and a big island lies at its center. Leopoldville sprawls along [illegible] at the lower [illegible] end of the Pool, just above the first of the rapids.

[illegible] on the opposite bank, and only a few minutes distant by [illegible], is Brazzaville, capital of French Equatorial Africa.

A few days [illegible] I left Leopoldville [illegible] my [illegible] around the Congo. I [illegible] to




Belgium and Its Countries Like It Could Be Linked [illegible] Congo Colony

[illegible] copper, cobalt, and uranium lie in Katanga Province. Industrial diamonds come from Kasai

[illegible] miles southwest of [illegible] Governor General was dedicating a new hydroelectric project.

### Zongo Falls to Generate Power

Because of the capital's rapid growth, its present electrical facilities already are inadequate. Zongo will furnish an additional [illegible] (enough to serve a small American city of about 100,000 people) when the project is completed in 1954.

At Zongo the broad waters of the Inkisi River [illegible] at 1,[illegible] feet [illegible] into a gorge just a few miles before joining the Congo.

[illegible] through barrier across the river a short distance above the falls, drill an intake tunnel straight through more than 2,100 feet of rocky hill, and set their generators in a bend in the deep valley below.

"What do you do when you are not pondering the multitude of problems this task will involve?" I asked a Swiss engineer.

"Read the National Geographic Magazine," he replied with a grin.

Several friends emphasized that my trip through Belgian Congo would [illegible] photographer. I really saw the Congo River. So I bought a ticket on one of the river boats, the *Reine Astrid*, bound for Stanleyville, more than 1,[illegible] miles upstream. There

**Shoppers Prop Their Bicycles Against the Pillars of an Elisabethville Arcade**

[illegible]

[illegible]

### Fantastic Appetite for Firewood

[illegible]

current—varying from one to five miles an hour—against which she was running.

Two crewmen with sounding poles sat on either side of the bow to warn of shallows.

"How can they tell deep water from shallow in such a muddy current?" I asked the first officer, after having watched the polemen take soundings only part of the time.

"By the sound of the 'moustache,'" was his answer.

"The moustache?"

"Yes, the cleavage of the water at the bow," he explained. "Its noise over deep water is different from the sound it makes when we cross shallows."

We bumped sand bars only twice.

Shortly after leaving Léopoldville we passed between bluffs, some of which Stanley once facetiously called the "Cliffs of Dover." Farther upstream the land levels out. For much of the journey until we neared Stanleyville we saw only water and the thick jungle along the river's edge.

In places the river spreads to a width of 10 to 15 miles, but the course is so strewn with jungle-covered islands that one seldom is aware of its full width. Indeed, even with a map it is difficult to tell where large tributaries enter the main stream.

### Natives Aboard Eat at Woodpile Pauses

We stopped at small towns to discharge and take on passengers and packing cases. At these stops and at woodpile pauses the native passengers and crew made a wild dash to buy food. Afterward the lower deck of the *Reine Astrid* became a clutter of steaming cooking pots and took on the appearance of a native market.

At other villages we reduced speed to unload and pick up packages and mail. People in dugouts hovered in midstream awaiting our approach and then raced alongside to clutch the gunwales. Other boatmen also made flying tackles at the *Astrid* to sell smoked fish, chickens, and fruit. Some villagers brought out clay pots and charcoal braziers.

Two days upstream from Léopoldville we stopped for the night at Bolobo, where there are a mission station and a few business concerns. Ivory carvers here did a lively trade selling their output to European passengers. Prices for upstream travelers, I was told, are cheaper than for those going downstream to Léopoldville.

Until we reached the junction of the Ubangi River we rode the boundary between French Equatorial Africa and the Belgian Congo. Hey and there, the river forms a huge scimitar-like curve within the heart of Belgian territory.

At the trim town of Coquilhatville we crossed the Equator. A heavy thunderstorm, common to the Congo Basin, was brewing. Wind blew and lightning rent the black massed clouds; then it began to pour. Even though we were on the Equator, the weather quickly turned cool.

Sometimes the winds of these tropical storms reach tornado violence, forcing the top-heavy, shallow-draft boats to seek quick shelter in the lee of the forest-covered bank.

Both Lisala and Bumba, farther upriver, are small but important towns. Bumba, particularly, has a thriving trade, as it is an outlet to the river, railway, and road system that taps the wide region of the northeast Congo. From this district come cotton, ebony and other woods, palm oil and palm kernels, copal, and other products.

### Science Improves the Congo

A little more than 100 miles short of Stanleyville is Yangambi, one of the most important spots in the Belgian Congo, for here is the headquarters of Inéac—the Institut National pour l'Étude Agronomique du Congo Belge.

Inéac's scientists coordinate practically all of the biological research carried on in the colony. Whether it be the development or selection of coffee, rubber, cinchona, or palm oil trees for plantation crops, the improvement of cattle, control of pests, the betterment of native foods, learning the results of "soil burning" under the tropical sun, or introduction of such new industries as silk culture the research workers of Inéac have a hand in trying to find the right answers.

Inéac has a research station of thousands of acres centered at Yangambi, but much of its work is conducted elsewhere. Its field stations are scattered throughout the colony.

Stanleyville comes close to being in the center of Africa, but anyone who pictures it as a lonely colonial outpost is due for a surprise when he sees it.

Gleaming shops and pleasant, frequently luxurious, homes perch on gardenlike banks of the river just below the lower of the seven cataracts that block transportation on the upper Congo. More than 2,500 Europeans and 40,000 Congolese live here.

I saw bulldozers cutting new residential streets; carpenters, bricklayers, and stonemasons were building homes and offices.

### Termite Hills Form Golf Hazards

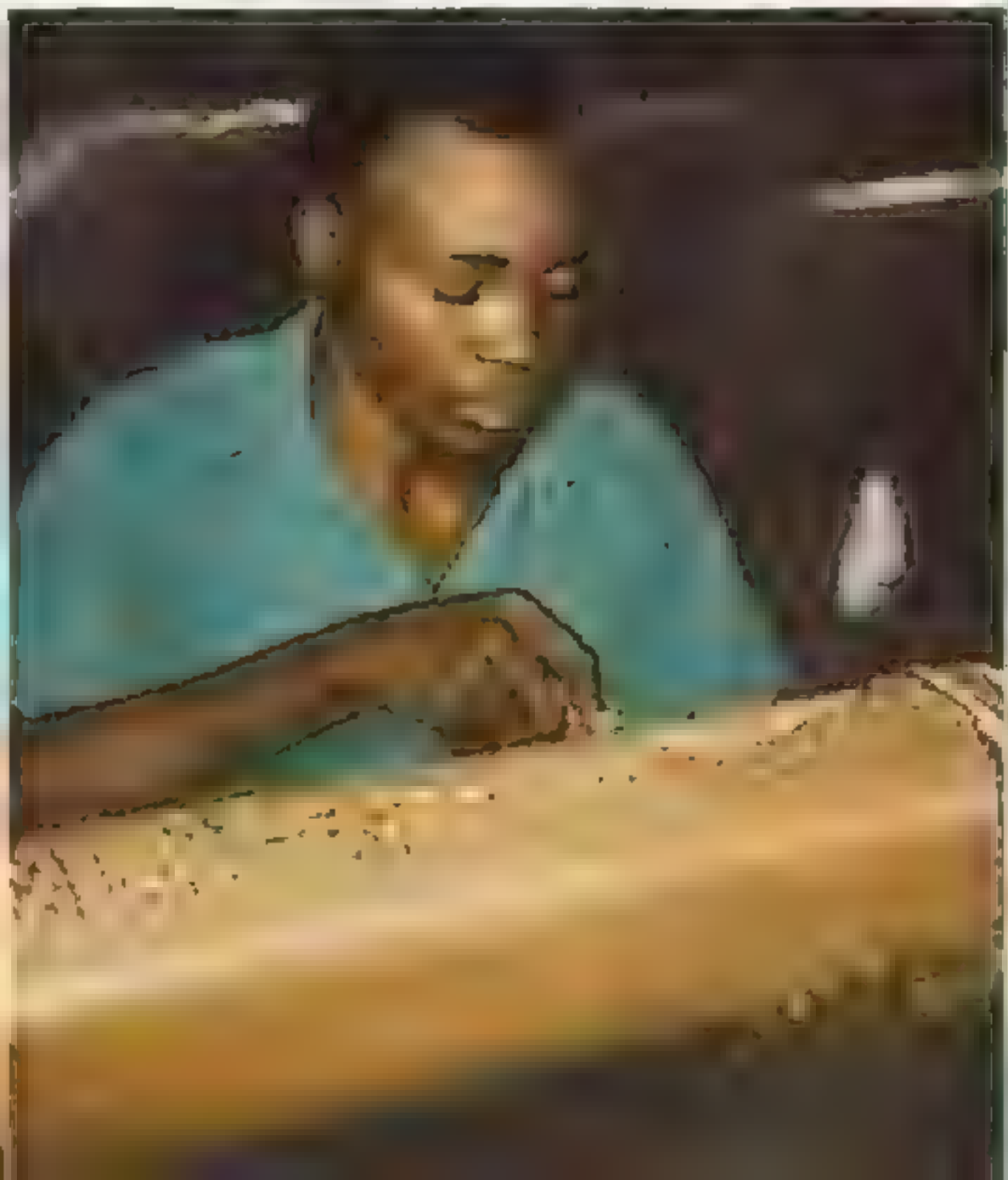
Seat of government for the large Oriental Province, Stanleyville also is distributing center for much of the eastern portion of the colony.

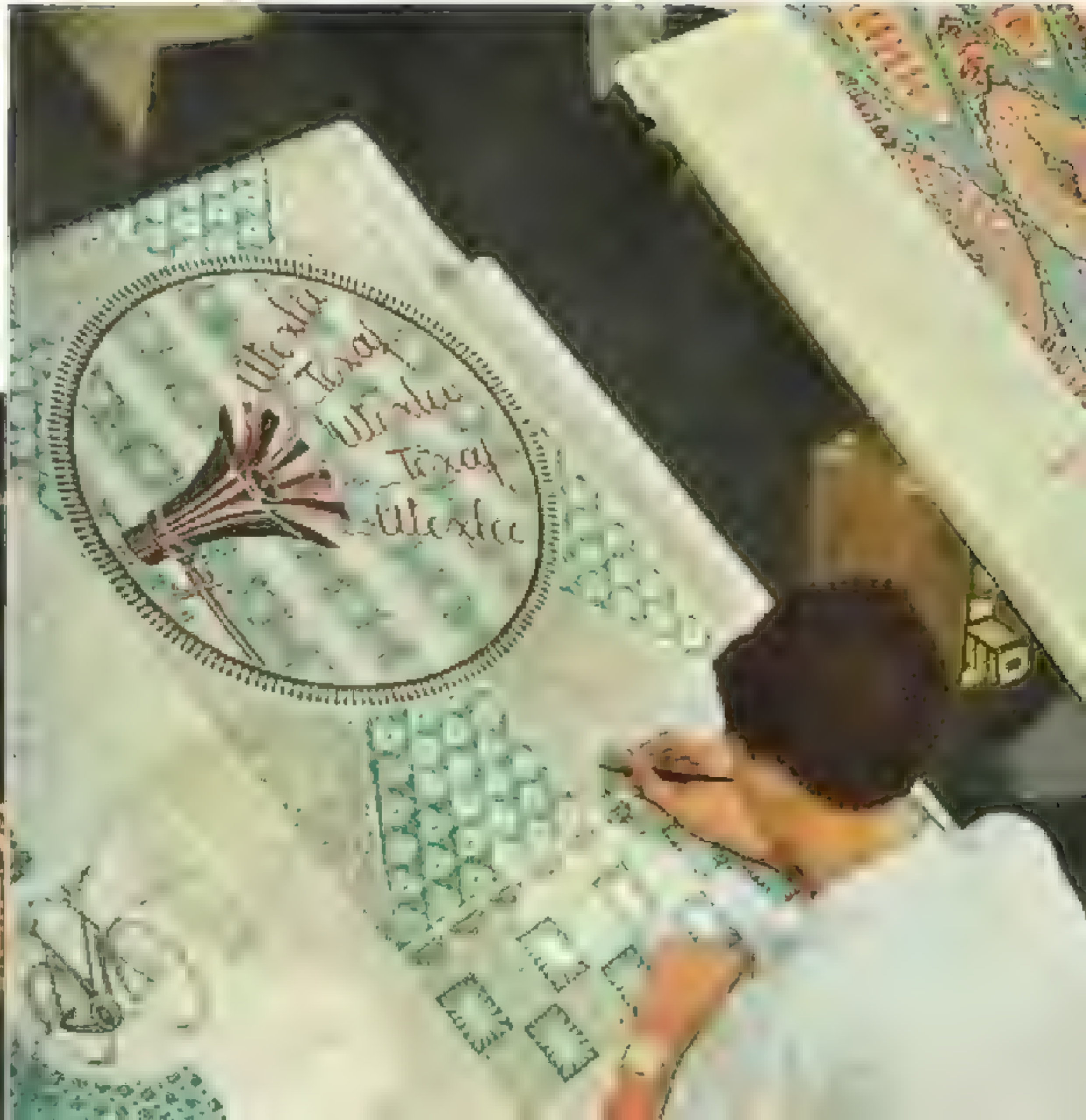
Numerous trucks bring in produce and carry away supplies for distant towns. Across

A Mandan Chief Winks at His Sister and Starts the Dance in Paris

Scrappers Salvaging
Leopoldville's
Street Market

## Bicycle and Loudspeaker Adorn a Textile Pattern





## World Lower Guess If Aegean Claims From the Mississippi

*General Gibson and Mustered Image Leave the Broad and Placid Congo. Passengers Lose the Rails*

## *Rosie Jared* Ties Up to Shore in Lend-Lease Period

No Auto Lines, No Traffic Jams. A Boat Man Can Scoop His Dinner from a Lake and Park It Anywhere

## Congo's Palm Nuts Yield Food-rich Oil for Cooking and Export

A Wagon: Wives Wash Clothes, Pots, and Babies in the Congo Rapids; Boys Anchor Basket-like Fish Traps

## Giant Gorillas Make Those Dead Volcanoes Then Lady Homes

## Vehicle Cattle Spread Lava-shaped Homes

Africa's "Untamable" Elephants Pursue Like Gentled Mustangs. They Leave Their Afternoon Splash in the River

A Hand-sized Sample in Rwanda's Green Mountains Yields Black Cassiterite, 76 Percent Pure Tin

Powerful Sprays Wash Away Light Gravels; Heavier Gold Settles in Sluice Boxes

the river, dock facilities are being expanded to handle the volume of trade that goes by railway around the 80-mile river barrier caused by the rapids.

Airlines tie the city to East and South Africa and to Belgium, as well as to towns throughout the colony.

When businessmen tire of office routine, they can always go out and play golf on a nine-hole course. Its hazards are huge grassed over termite hills. And anyone who slices into the rough really has it rough, for the course is hemmed by lush jungle. But fairways and greens are perpetually fresh with springy grass.

Just outside town is delightful Tshopo Falls, where the Tshopo River leaps madly over a rocky cliff shortly before its waters pour into the Congo.

While the cataract on the main river is less spectacular than Tshopo, it is here that the tribal Wagenia fishermen daringly string their fish traps in the rapids and as daringly paddle their canoes into the rushing water to collect their catch. Across much of the width of the river they have set up a spindle-legged network of poles to which they fasten long funnel-shaped woven traps by means of flexible lianas (pages 336, 337).

Besides these Wagenia, who keep much to themselves and to their dangerous occupation, Stanleyville has an "Arab" settlement, a Negro Moslem remnant of the days when Arab traders and slave raiders roamed central Africa.

From Stanleyville I took off by car to see the northeastern and eastern parts of the country. Our trip started in a tropical rainstorm, but on this first day's drive we covered nearly 300 miles, arriving late at Wamba in another blinding downpour. This route threads heavy bush much of the way, but passes a few plantations of rubber and coffee.

### Traffic Jams at River Ferries

At the Lindi River near Bafwasende* I experienced the first of the *bacs*, or ferries, in the Congo. When we reached it, I visualized waiting hours. Ahead of us were a dozen or more trucks. Another truck, half off the ferry, was stuck against the incline of the road.

When it finally was freed, my driver immediately drove to the head of the line and went aboard. Passenger cars, I learned, go first, for heavily loaded trucks have a habit of getting into difficulty negotiating the light pontoon ferries (page 356).

Until recently, virtually all rivers in the Congo had to be crossed by these ferries. Since the war, the Government has bought a large number of Bailey bridges to span many of the streams.

From Wamba we drove north to Paulis, in the region of the Mangbettu tribes. The Mangbettu are the people who have long, tapering skulls from head binding in infancy. The custom now is discouraged and is dying out; in only a few outlying villages did I see infants whose heads were bound (p. 346).

The day I called upon the chieftain, I saw his palanquin and eight personal bearers resting outside the local court building, where scores of people were gathered to pay taxes.

The young chief courteously invited us to a dance later that day, then apologized for having to leave immediately for an appointment. I readied my camera to picture him leaving by palanquin, but he dashed away on a bicycle!

That evening, when men started beating hollow log drums and tom-toms, and half-nude villagers began jigging in strange dance steps or excitedly brandishing spears and shields, I soon discovered that old customs of Africa had not entirely vanished (page [illegible]).

Leaving Paulis, we rode through several coffee and palm-oil plantations, then continued northeast into more open country.

Passing through open bushland, I saw numerous gray earth formations, two or three feet high, shaped like giant mushrooms. Some of these "mushrooms" were multiple-storied and had wide overhanging roofs. They were an unusual type of termite nest.

### African Elephants Trained to Work

At Gangala na Bodio we came to a remarkable school—a school for elephants. Here the Government maintains a station for domesticating the big African beasts (page 340).†

When I arrived, the station's annual hunt had just ended. Fourteen young elephants had been added to the herd. In some annual dry-season hunts, as many as 30 or 40 are captured.

The work at Gangala na Bodio belies the old belief that African elephants cannot be trained. Their domestication has been successfully carried on since 1902 after King Leopold II had ordered Commandant Laplume to try to train some for transport service. Traditional example of the use of African elephants was Hannibal's famous march over the Alps.

To capture the elephants, native *chasseurs* on foot, armed with lassos, creep up to a herd.

* See "Curious and Characteristic Customs of Central African Tribes," by E. Torday, NATIONAL GEOGRAPHIC MAGAZINE, October, 1929.

† See, in the NATIONAL GEOGRAPHIC MAGAZINE, "Trans-African Safari," by Lawrence Copley Thaw and Marjorie Shaw Thaw, September, 1934; and "Nature's Most Amazing Mammal," by Edmund Heller, June, 1944.

Boomin' Tempe Jacks at Midday Shuts Up Shop and Gets Off the Streets; Nearly Everyone Takes a Siesta

## An Electric Shovel Gnaws the Earth for a Trainload of Copper Ore

Margherita Bastian Dresses Long Heads, Twisty Headdress, and Facial Scars

single out a young beast, and dash after it to rope its legs. Once it is lassoed, the men snub the ropes around trees to prevent its escape. In the melee of the stampede, the mother or other adults sometimes attack and have to be shot.

Captured animals are tied to tame monitor elephants to keep them in control. Kept with these monitors, they are systematically trained for 10 to 12 months. They become as obedient and intelligent as are Indian elephants. I saw young elephants, captured only a month before, already responding to their schooling; they were begging sugar cane and manioc root from their *cornacs*, or mahouts.

Best time for visitors, and for the elephants themselves, is morning and evening when the herd shuffles down to the river to bathe.

### White Rhinos Roam Northeast Congo

From near Gangala na Bodio and extending northeastward to the Sudanese border, the Government has created a reserve, the Garamba National Park, embracing more than 1,235,000 acres.

In this bush and open grassland wander herds of elephants, giraffes, numerous kinds of antelopes, including the giant eland, and both black and white rhinoceroses. Here is one of the few places in Africa where white rhinos can be found.

While visiting Garamba, I called at the camp of a group of Belgian scientists who were making a survey of its insect and animal life. In traps and in specimen containers I saw thousands of different kinds of insects, large and small. The men also had collected snakes, fish, crocodile eggs, spiders, beetles, and a multitude of other specimens.

One beetle the scientists showed me has a remarkable means of self preservation. It makes for itself a mud ball, larger than a baseball, within which it imbeds itself and remains protected even against the fires set by tribesmen in clearing lands of tall grass.

From Garamba I turned south to Watsa, and for more than a week roamed around Watsa and Monghwalu, farther south, visiting numerous gold workings of the Mines d'Or de Kilo-Moto.

Having an extensive concession, this company includes in its operations the simple washing of alluvial gravels along valleys, the use of big power shovels and dredges, and chiseling and blasting gold-bearing quartz from the rocky hills, in both open-cut and underground diggings (pages 342 and 348). Ores are processed in huge ore-crushing plants.

Besides the gleaming bricks of gold from the refinery, I also saw several rare specimens of crystal-shaped formations that have been found as tiny nuggets during nearly 50 years of operation.

Gold production in the Congo has ranged from 300,000 to some 500,000 fine ounces annually during the last 10 years. In 1950 the amount was more than 330,400 fine ounces, representing a value of about $12,000,000. The output of Kilo-Moto's mines accounts for a sizable portion of that amount.

### Africa Split by Huge Land Crack

Eastward and southward from this mining district lie scenic rolling uplands, rising to 7,000 feet elevation, where cattle herds pasture and where there is considerable colonial settlement.

Along the eastern frontier of the Congo, however, the land seems almost to drop from under one's feet. Here one comes to the precipitous edge of the western branch of the Great Rift Valley, one of Africa's outstanding geographical features. The valley floor lies hundreds of feet below sharp escarpment walls.

Actually, this vast land crack begins in Syria and extends through the Jordan Valley, the Red Sea, and much of the length of Africa. Within the portion edging the Belgian Congo lie Lakes Albert, Edward, Kivu, and long deep Lake Tanganyika.

As we twisted down the escarpment to the port of Kasenye on Lake Albert, it grew hot. This Nile lake lies at an elevation of little more than 2,000 feet.

The lake steamer that calls here, and at Mahagi Port farther north, is operated by the East African Railways and Harbours Administration, which maintains a water-rail link across Uganda and Kenya to Mombasa, on the east coast.*

Lake Albert's waters are well stocked with fish, among them the famous Nile perch (*Lates niloticus*), known to reach the weight of 266½ pounds. There is also a reported catch of 280 pounds. The reedy south end of Albert, where the Semliki empties from shallow Lake Edward, seethes with crocodiles.

### Fabled Land of Pygmies

On our motor trip toward Beni we entered the tropical Ituri Forest. At one spot we temporarily abandoned our car and hiked a narrow jungle trail to visit a group of Pygmy people. In a clearing beneath big trees we found their four-foot-high huts of twigs and leaves.

One by one the tiny, kinky-haired men, women, and children shyly came from the bush. Among them I felt almost like a Gulliver in a jungle Lilliput (page 301).

* See "Belgium Tackles the East African Bush," by W. Robert Moore, NATIONAL GEOGRAPHIC MAGAZINE, March 1950.

**Driller and Helper Prepare Gold-bearing Quartz Ores For Blasting.**

The Mines d'Or de Kilo-Moto operates numerous surface building [illegible] underground diggings. It follows these lifted [illegible]

[illegible] three pygmies, [illegible] several aged adults, were only about four and a half feet tall. A few were taller, indicating some admixture of Bantu blood. [illegible] hunters, and even will attack elephants. The arrows and poison [illegible] are often [illegible] with poison.

[illegible] Rift Valley, near the Mountains of the Moon.* For several days I watched Ruwenzori's snow peaks play hide-and-seek [illegible] clouds [illegible] a view of the snows [illegible] and again one evening when sunset had turned the glaciers a pale alpine [illegible] Towering above [illegible] several lower peaks [illegible] detached [illegible] from [illegible]

In the Rift Valley at the base of Ruwenzori and extending southward across Lake Edward to Lake (Lac) Kivu, is one of the [illegible] game reservations of Africa. Here the Belgian Government has set apart an extensive [illegible] for Albert National Park.

Elephants, buffaloes, lions, and numerous [illegible] wander over the [illegible] Thousands of flamingos congregate at Lake Edward; more thousands have on their [illegible] horns or blow bubbles in the Katwan River.

[illegible] wide. A [illegible] variety of [illegible] climatic [illegible] Here are lake [illegible], flat plains [illegible] ropes that tilt up [illegible] volcanic crews. Near its southern end, too, the earth still is in the making from volcanic fires. [illegible]

* See [illegible] "Mountains of the Moon," by [illegible]

[illegible] Mountains of the Moon." [illegible]

**Diamonds! Fashion's Brightest Star and Industry's Hardest Tool**

[illegible] will cut diamond, the hardest object known. Tool and drill makers use the stone to [illegible] the toughest alloys and rocks. This woman weighs some 500,000 carats a year at [illegible] (page 380).

Because the park is hemmed between Rift walls [illegible] migrations of plants and animals are few. The [illegible] for the study of plant and animal life. I found it [illegible] to watch the animals.

[illegible] activity [illegible] the region [illegible] in Lake Edward [illegible] in the [illegible] [illegible] themselves.

## Volcanoes Flame in Lake Kivu District

To me the Lake Kivu region is one of the most striking [illegible] (14,780 feet) [illegible]. Just to the south and east [illegible] peaks.

Two of the volcanoes, [illegible] and Nyiragongo, [illegible] fire.* From flower-embroidered, Lakeside [illegible] I [illegible] like the Biblical pillar of cloud by day and pillar of fire by night. [illegible]

Several [illegible] lava flows [illegible] the north end of Kivu. [illegible] in March, 1948, when [illegible]. These flows still lie in black [illegible] that ends in the lake. One [illegible] completely [illegible] by an older lava flow (page 386).

[illegible] forests [illegible] of the volcanoes. Elephants [illegible] feet [illegible].

*See "[illegible]," by [illegible], National Geographic Magazine, [illegible].

Highest of these volcanoes, Karisimbi (14,787 feet) and Mikeno (14,557 feet), had their heads whitened with snow when I saw them (page 338).

Motoring eastward along the base of this volcanic chain, we traveled into Ruanda and Urundi. This region was a portion of former German East Africa, which Belgium received by mandate after World War I.

Having felt like a giant among the forest Pygmies, I suddenly was to feel small when I met the Watusi tribesmen of Ruanda. Some of the men are seven feet tall.*

These long-legged men are famed for their high jumping. From a running start, they take off in soaring leaps from a low termite nest. They remind one of pole vaulters minus the pole (page 362).

Many of the old customs of this unusual people are now vanishing; yet I did have the opportunity of witnessing one of their wild, colorful dances. Performers leaped and stomped to the jangle of ankle bells and swished their monkey fur and fiber headdresses (pages 352, 353).

Educated by European tutors, the Mwami, or king, of Ruanda, lives in a modern palace at Nyanza and drives about in a shiny new Lincoln automobile. I met him at Usumbura, and also the Mwami of Urundi, who likewise is well-educated and progressive. The latter had an equally new and shiny Cadillac.

High plateau lands of Ruanda and Urundi are green and rich. Driving through the country, we passed terraced farms and saw large herds of colossal-horned cattle grazing on fresh hillside pastures (page 340). Tin and gold mines scar some of the slopes.

To get to Usumbura on the shores of Lake Tanganyika we again spiraled down the Rift escarpment. From this trim, fast-growing town, it is another steep climb up the Kamanyola escarpment to reach Costermansville, 110 kinking road miles to the northwest.

### Tom-toms Control Traffic

Almost as interesting to me as the spectacular views one gains of the Ruzizi River gorge, through which Lake Kivu empties into Lake Tanganyika, is the novel system used to control traffic on the narrow mountain highway. Watchers, stationed at strategic lookouts on the hills, hoist and drop crude semaphore signals and tom-tom on empty oil drums to direct traffic one way at a time.

Few towns can boast a more delightful setting than Costermansville. Much of it sprawls on several fingerlike peninsulas that jut into the southern end of Lake Kivu; the rest perches on surrounding hills.

The climate of Costermansville is as delightful as its setting; its altitude gives it the mildness of a European summer. I met a number of Belgian residents who had not been away from the place for years and saw no reason for vacationing in Europe.

During the war, when military occupation of Belgium left the colony to its own resources, schools for European youngsters were established here to afford full education up to continental university entrance requirements.

The countryside about Costermansville is given over to prosperous agriculture and stock raising. Here are numerous plantations of dark-green cinchona trees, from whose bark, stripped after the trees are cut, quinine is extracted. On these rolling hill lands are large fields of pyrethrum, whose daisylike blossoms are plucked for the insecticide they contain. Native farmers also hoe garden patches on the slopes.

### World's Second Deepest Lake

From Costermansville I headed southward by plane for Elisabethville, center of the colony's biggest mining enterprise.

On the way we touched again at Usumbura and flew nearly half the length of Lake Tanganyika to Albertville. Not only is the lake long (400 miles), but it is second only to Lake Baikal in Siberia as the deepest lake on earth. The bottom of the western branch of the Great Rift Valley trench lies more than 4,700 feet beneath Tanganyika's blue surface.

After circling Albertville's modern hilltop church and town and skimming low over its protruding mole, which serves as port and as a dry dock for lake steamers and barges, our plane came to rest on the lakeside airstrip.

The town is headquarters for the railway and water communications that tie the Tanganyika region with Stanleyville and Lualaba River (or upper Congo) towns. Only a few miles away is one of the two workable coal deposits in the Belgian Congo.

From Albertville we hopped to Manono. A few years ago this was an almost empty spot in an empty semidesert wasteland. Now Manono is a thriving town of fresh gay homes for both Europeans and natives. Its magic has been cassiterite, a tin ore. In it also are small quantities of the rare tantalite ore.

Piles of earth tower like pyramids beside the town, and wide-open cuts yawn where miners are digging out ores. The whole operation from digging to turning the tin into ingots, is done by efficient mechanization with electrical power. A river has been turned to bring water to the once-thirsty site.

Flying southward from Manono, we saw waterfalls breaking from high cliff walls near

* See "Land of Giants and Pygmies," by Duke Adolphus Frederick of Mecklenburg, NATIONAL GEOGRAPHIC MAGAZINE, April, 1912.

Elisabethbaden, Copperbeam Town, His Spring Cure from Bare Residential on the Negro

**Ankle Bells Tinkle, Filmy Plumes Fly as Leaping, Stamping Russian Dancers Make a Pretended Charge**

[illegible]

## A Seventy-Watt Arsenical Dyes the Labor of Humble Brutes

## A River of Lava Lies Frozen in Its Tracks Close to Lake Kivu

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

## In Plaited Cane and Brass Ankles Stands the Mighty King of the Bassoos

### Crossing by Ferry Is an Adventure

[illegible]

### Buckets on Heads Babies on Backs

[illegible]

## Indie Wedder Stales Dancer; the Grand Orchestra Gives Triumph

the eastern frontier. To the west spread marshlands and streams that culminate in a chain of lakes, of which Upemba is largest.

There is little about gleaming Elisabethville, or E'ville, to indicate that it ever was a mining camp. In fact, from its inception some 40 years ago the town was carefully planned with wide streets, good shops, and good housing. Today E'ville is the second largest city in the Belgian Congo (page 351).

### Elisabethville Capital of Mining Empire

To understand Elisabethville, and indeed to understand the industrial and mining empire that has grown up on this once-isolated plateau of the Katanga, one has to look to the Union Minière du Haut-Katanga.

A branch of the colossal Société Générale de Belgique, the Union Minière holds a huge mining concession covering more than 15,000 square miles.

During the years of its operation, the Union has been responsible for a network of railroads into the region. One line ties with Northern Rhodesia to bring in coal. Two other routes afford access to the Atlantic coast. One line links westward to Angola; the other twists northwestward for nearly 1,000 miles to reach Port Francqui, on the Kasai River, one of the branches of the Congo.

The Union Minière also has spawned a number of subsidiary companies to furnish electricity, make explosives, mill flour, provide housing, and produce chemicals from the by-products of the mines.

In truth, virtually everything one finds in the Katanga except the bushland, minerals, and the excellent climate has been brought in by the Union. A large majority of the 17,000 white persons and 1,281,000 Congolese in the Province are connected in one way or another with the Union.

Many of the natives were brought here because the countryside formerly was sparsely populated. They have been comfortably housed, given expert medical attention and schools, and the workers trained for their jobs (page 357).

The region contains a fabulous wealth of minerals. Here, besides the vast copper belt, are cobalt, uranium, zinc, manganese, and lesser amounts of other minerals.

The one vivid evidence that E'ville is a copper town is the huge smelter which stands at the edge of the city, a short distance beyond the gay Lido swimming pool. Its colossal chimney and a towering heap of black slag are conspicuous landmarks.

Northeast of the city is the gaping hole of the old Etoile mine, now exhausted.

Biggest mine in the vicinity now is the one at Kipushi, about 18 miles to the southwest. This mine, the Prince Léopold, is notable for two reasons. It is the only one in Katanga in which there is deep underground digging, the others being open cuts. It is also known as the "patriotic" mine.

The ore first was discovered as an outcrop only about 900 yards from the Rhodesian border. For a short distance it sloped down at an angle of 45°; then abruptly, only 200 or 300 yards short of the frontier, it turned vertically downward to remain entirely within the Belgian Congo—hence the "patriotic" label.

Around Jadotville and Kolwezi the earth gapes with several open cuts where other rich deposits of copper and cobalt are being mined. Here, too, are concentrators, a huge electrolytic [illegible] plant [illegible] furnace to turn the ores into gleaming metal.

In a peak production year the Union Minière has produced nearly 194,000 tons of copper, together with some 8,000 tons of cobaltiferous alloy and 2,390 tons of granulated cobalt.

### Source of Uranium for Atom Bombs

In this same rolling bushland, at Shinkolobwe, is the famous deposit of radioactive pitchblende. Before World War II it was known as a radium mine; now it is one of the major sources from which the United States gets uranium for atom bombs. The Union Minière talks little about the present work at this mine, and the route to it is carefully guarded. Even its name is missing from most Belgian-made maps.

"Only two persons know how the ore is shipped from the Congo," the security administrator told me.

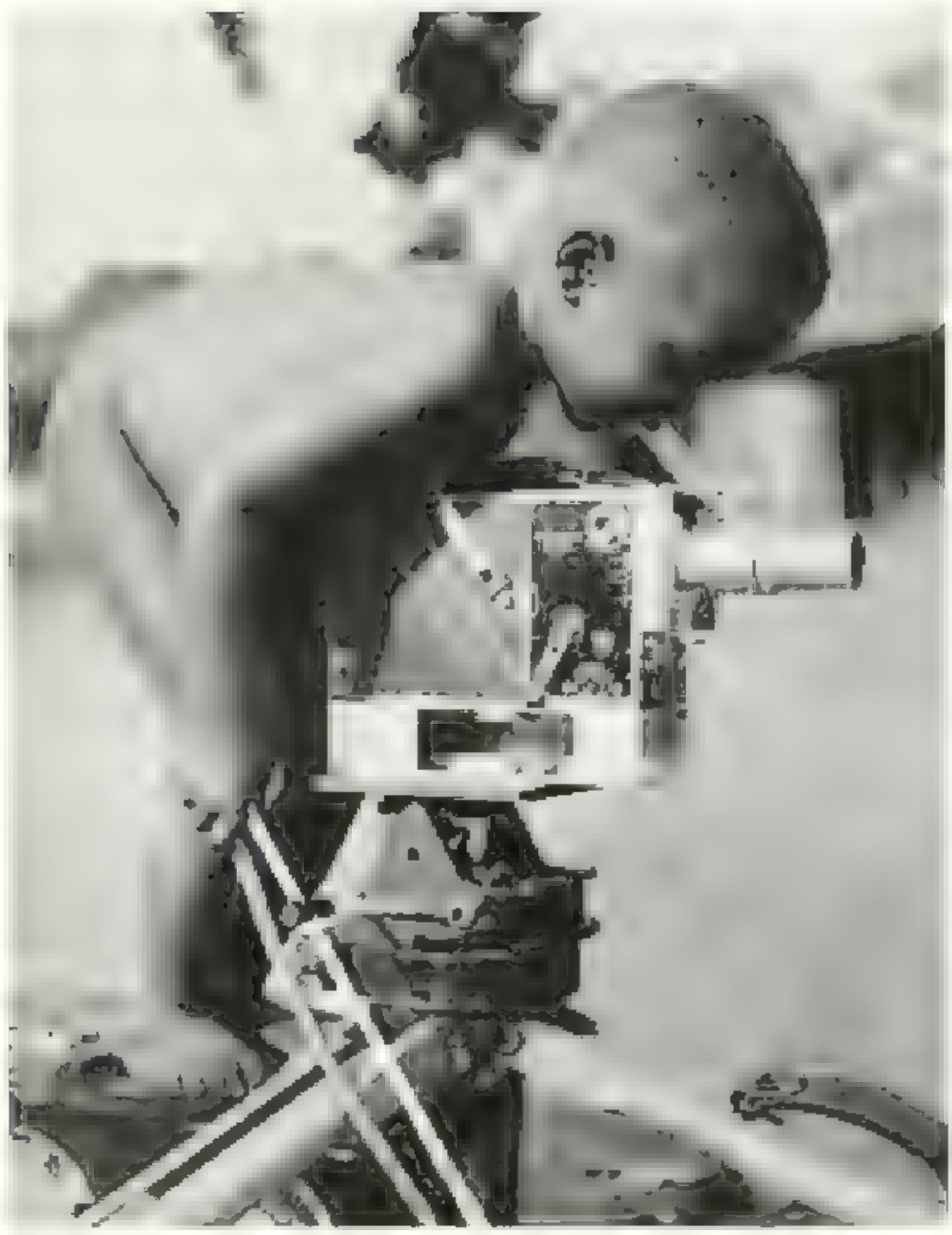
"You and who else?" I asked, jokingly.

"We will skip that one, if you don't mind," he answered.

A few miles from Kolwezi I visited the Zilo Rapids, site on the Lualaba River where a new hydroelectric dam is being installed.

At the time of my visit, workmen had begun pouring cement for the dam, which when completed will form a 216-foot-high block in the gorge. From this dam water will be conveyed to generators by a tunnel which is hewn through more than a mile of solid rock.

I went underground to watch the tunnel being bored. The "Big Junbo" driller, a framework the size of the tunnel, upon which are mounted 14 air drills—hap[illegible] quiet when I entered. Suddenly the [illegible] one drill began assaulting my eardrums; then another joined in; then another. When all 14 were working, I no longer recognized the din within the confined tunnel as sound at all, but as a terrific pressure on my ears. It became sound again only when some of the



Young Lemba Seen Grants as the Photographer Sees Them

[illegible]

[illegible] and [illegible] I became aware of indistinct vibrations.

I was nearly dead [illegible] hours afterward. Only with difficulty [illegible] I hear the superintendent explain that [illegible] will be in operation in 1951 and that the completed installation will yield an output of [illegible] pounds.

[illegible] of the usual [illegible] we [illegible] gained [illegible] the journey on a visit to the United States.

Not only here [illegible] throughout the mining [illegible] quantities of specimens marked [illegible] have [illegible] generations [illegible] have [illegible] X-ray equipment in medical laboratories.

[illegible] Kasai to Lubumbashi, [illegible] Katanga Province, in the south-eastern Congo. How much I was due for a surprise. Probably no other town in the colony has [illegible] as Lubumbashi. [illegible]

[illegible] the last [illegible] years. Most of the [illegible]

The reason for this [illegible] provinces [illegible] from Luxembourg [illegible] have been brought [illegible] Lost France.

The [illegible] standing [illegible] and [illegible] and people.

Not the least of these — its people, for the majority of the workmen and their families who [illegible] to the mining districts of Katanga come from [illegible] Kasai. The Province supplies cattle, corn, and other food needed in Katanga.

### A Million Carats of Diamonds a Month!

The Kasai's own mining interests are [illegible] nature. There are two [illegible] dealing diamonds centered at Tshikapa in the south-west of Lulua[illegible] and Lubumbashi at Bal[illegible] to the east.

[illegible]

[illegible] industrial diamonds [illegible] United States for [illegible] and other [illegible] uses.

[illegible] Tshikapa are found in alluvial [illegible] worn by stream washing. Apparently [illegible] have not moved far from where [illegible] were [illegible].

Are there no volcanic pipes in South Africa [illegible] from which they [illegible] official.*

* [illegible]

"There must be," he said, "but that is what you Americans would call your 864 question. Our geologists are searching, but thus far they have found none."

Turning from diamond mining, I motored to Port Francqui and Brabanta to see a huge palm-oil plantation.

On the way I detoured through Mushenge to visit the tribal king of the Bakuba people. Reaching his court, a bamboo and thatch village, we were escorted through several reed fences and outer buildings to a pavilion where we met the king.

A huge, elderly man, he apologized for not having dressed in full ceremonial costume for his photograph (page 353). I could hardly blame him, for his ceremonial outfit is a heavy mass of cowrie shells and beads which requires nearly two hours to put on. When fully dressed, and further burdened with heavy coils of copper around his legs, the king has to be assisted by two attendants to move or sit down.

**Pygmies Stand Not Even Shoulder High to the Author's Driver**

[illegible] hunters out for [illegible] carry poison [illegible] Since [illegible] attacked [illegible] One wears a casted coat

In another courtyard a few of the king's 350 wives were blowing on gourd "musical instruments," while others, carrying animal-tail fly whisks, shuffled in odd dance steps.

After having seen some of the Bakuba men running power tools and doing other skilled tasks at the mines in Katanga, it seemed strange to come here and observe the ancient ways of the court.

### Palm Plantations Yield Oil for Export

The palm growing and oil extraction that I saw later in Brabanta and elsewhere is one of the important industries in the Congo. The African oil palm tree (genus Elaeis) grows in wild abundance throughout the country, but oil production comes mainly from cultivated plantations (page 357).

The oil-bearing fruits of this palm grow in huge clusters, sometimes weighing as much as 50 or more pounds. Individual fruits are about the size of a small plum and have a tough skin, oily fibrous flesh, and a rather hard-shelled nut containing the kernel.

The pulpy portion contains one type of oil (palm oil) which, when freshly extracted, is bright orange-yellow or reddish in color. It is used extensively as cooking oil by the Congolese. One of the excellent native dishes I ate in the Congo was *moamba*, chicken cooked in the oil and served (with a fiery sauce) on rice.

The kernels contain another kind of oil similar to coconut kernel oil. Most of these are shipped abroad to vegetable-oil companies instead of being processed locally.

Two large corporations and a number of smaller companies grow and process palm oil, producing more than 170,000 tons of palm oil and nearly 115,000 tons of palm kernels a year. Much of it is for export, but some is converted locally into soap and margarine.

Several tanker barges ply the Congo and its

**A Tall Watusi Jumper Clears the Bar at Seven Feet Six Inches**

Watusi high jumping originated as an exercise [illegible] warriors. Leopards now perform [illegible] at festivals. A [illegible] jump from [illegible] to [illegible] inches [illegible] cannot be surpassed [illegible] records (p. 37[illegible])

[illegible] carrying oil in bulk; others have [illegible] and decks piled with 50-gallon drums.

From the Kasai I flew back to Léopoldville completing my 8,100-mile circuit around the Congo.

Beyond [illegible] much of what the Congo is about [illegible] ing, I called upon Dr. H. A. A. Cornelis to ask what the colony plans for the future. In addition to being Director General of Economic Affairs, Dr. Cornelis is Director of the Secretariat of a 10-Year Plan for the Economic and Social Development of the Congo.

Dr. Cornelis told me that work is already under way on an extensive program to reduce the cost of transport and to develop electrical power for industrial use, since the colony lacks coal.

Although the Congo has some 69,375 miles of highways, most of them are only dirt roads that cannot stand heavy truck traffic. The plan calls for several arterial routes which will thread the colony from north to south and east to west.

"One of the first [illegible] the road between [illegible] and Léopoldville [illegible] the Director General [illegible] building machines [illegible] A loan from the United States has already been unloaded at Matadi; more is on the way."

He explained the concentrated effort being [illegible] to the study of foods for the natives [illegible] clothing, hygiene, and education.

[illegible] much interested in reading your April [illegible] NATIONAL GEOGRAPHIC article on Growing Pains Beset Puerto Rico," Dr. Cornelis continued, "for we have our growing pains ourselves, but of a different nature, many of which are being felt in this [illegible]

The [illegible] of [illegible] policy is to develop a systematic combination of mechanization and manpower which will reflect itself in higher wages, increased purchasing power, and better conditions for the [illegible] population. This factor will create new markets and utilities for the rapidly growing Congo.

# Barbados, Outrider of the Antilles

## For 300 Years Fields of Sugar Cane, Rippling in the Trade Winds Have Been This Caribbean Island's Life

By Charles Allmon

*With Illustrations from Photographs by the Author*

MORE than 325 years ago the captain of the English supply ship *Olive Blossom* found a small island, shaped somewhat like a pork chop, lying east of the curving archipelago that guards the Caribbean. He erected a cross and claimed the land for his king by scratching on a near-by tree "James K. of E. and This Island." There was none to protest, for nobody at all lived on the verdant isle.

In 1952 this same island—Barbados—is the second most densely populated territory or country in the Americas. Some 210,000 people crowd its 166 square miles—about 1,250 inhabitants to the square mile, as compared with Bermuda's 1,670, Puerto Rico's 645, or 51 for the United States.

### Crowded Island a Sugar Bowl

Even this astonishing figure only hints at how crowded Barbados really is. Most of its teeming human load lives crammed together on only about one-fifth of its territory. Much of the remaining four-fifths is devoted to a single business: raising sugar. In Barbados, sugar is king.

Getting acquainted with this 21-mile-long sugar bowl took time. I drove many miles through the countryside to admire the short-lived spectacle of ripening sugar cane, everywhere vast multitudes of rustling cane arrows quivered in the January trade winds.

At Locust Hall Estate, first of many big plantations I visited, I watched sweating cane cutters, armed with formidable razor-sharp "cane bills," sever stalks from the ground with swift, sure strokes. A second slash decapitates the green top leaves, used to feed animals. A rake of the cane bill down the length of the stalk cleans it off.

Cane cutters prefer to cut with the wind, for the fields are oven-hot and tall cane blocks the breeze. Women follow the reapers and carry the cane to waiting red trucks or, on smaller estates, to mule-drawn carts. Harvesting continues in full swing until about June.

The history of Barbados is the history of sugar growing. "James K. of E. and This Island" apparently was preoccupied with other matters of state, and it was during the reign of his successor that a wealthy London merchant, Sir William Courteen, equipped a colonizing expedition to Barbados. His ship landed in 1627 near the inscribed tree, and there the colonizers founded Jamestown, now called Holetown (map, page 360).

### "Little England" Is Proudly British

Under Britain the trim little island has progressed peacefully, for the most part. Unlike most of its neighbors, it has never changed hands. Intensely British, Barbados is proud of its ancestry. Names like Hastings, Yorkshire, St. George, and Bridgetown's Trafalgar Square impart to this "Little England" some of the atmosphere of old England.

Only the name of the island itself implies mixed parentage. It was probably coined by early Portuguese sailors so impressed by the bearded fig trees they found that they called the land "Barbudos"—"beards."

Sugar cultivation began in earnest in 1640. News of the first small yields from a few scattered plantations quickly reached England. Then one of the world's most precious commodities, sugar promised fabulous wealth. Planters envisioned every inch of the island's arable land under cane.

It was the age of slave labor. Shiploads of Negroes were brought to Barbados. Today the island has some 200,000 Negroes; only about 10,000 residents are white, and 150 East Indian.

### Windmills Grind No More

In the early days of sugar manufacture, cattle and horses turned the mills. Then came windmills. One planter recently reminisced: "In those days we worked only when there was a breeze. Frequently we had to rouse our labor at midnight, praying the wind would hold. Sometimes the mill [illegible] several days while we worked around the clock."

The last windmill ceased grinding in 1946. [illegible] have disappeared. Most of the picturesque mill towers are [illegible]

As I drove through St. George Parish, I passed heavy-laden trucks and mule carts lumbering toward Bulkeley factory, largest of Barbados's 36 sugar factories. At its big receiving platform about 20 vehicles queued up to discharge bulky loads.

I watched a wide-jawed crane swoop up several tons of cane, a full truckload, in a single bite and drop it on a briskly moving

For State Occasions, "Little England's" Governor Wears Full Dress and Cocked Hat

Sir Alfred Savage, a veteran of 33 years in the Colonial Service, is the 65th Governor of Barbados. [illegible]

[illegible] Revolving knives and heavy rollers [illegible] 55 per cent of [illegible].

The [illegible] British [illegible] to the [illegible]. [illegible]

## 20,000 Tons of Sweetness

[illegible] W. [illegible] conducted me through the [illegible]. "We hope to [illegible] about 20,000 long tons of sugar this year," he told me.

[illegible] the sugar [illegible]

[illegible]

[illegible]

In 1951 Barbados [illegible] more than 140,000 long tons of raw sugar and over 25,000 [illegible] 1951.

At the British West Indies Central Sugar Cane Breeding Station [illegible]

Experimental work [illegible]

## George Washington Lived Here

[illegible]

**When Winter Grips the North, Barbados Sands Invite Bare Feet and Summer Dress**

Bathers in a coast's more level areas, which [illegible] from cliffs [illegible] are called "Music Rocks" from the music [illegible] made by [illegible] swimming is excellent the year round.

At the corner of Chelsea Road and K[illegible] Street stands George Washington House. The famous soldier-statesman lived there for nearly two months with his half-brother Lawrence who was seeking to regain his health. [illegible] was only 19 at the time. He was [illegible] by the planters' hospitality, but surprised at their luxurious living.

Virginia's future "first farmer" was favorably impressed with the island's careful agriculture. "The very grass that grows amongst their corn," he wrote, "is not Lost but carefully gathered for provender for their Stock."

Intensively is land cultivated in Barbados [illegible] it has been called the "island without [illegible]." Almost literally every square foot of tillable land is used, to support the large population.

Weeding has been done so carefully and for so many years that weed seeds are virtually nonexistent except as they arrive from lands outside.

Crops are rotated regularly, and when a field is not sown to sugar, it is quickly turned to producing yams, sweet potatoes, maize, and other staples. By law, each plantation must devote part of its acreage to such food crops.

The fact that the island's thin soil has not been depleted by three centuries of such heavy farming has astonished agriculturists. Nondepletion is due mainly to two factors.

First is the careful use of fertilizer, chemical, animal, and vegetable. Unused portions of the sugar cane, together with fibrous material from food crops, are mulched back into the soil.

Second factor is the island's geological formation, which works to prevent erosion. Most of Barbados, under the thin soil, is covered with coral limestone, nearly 300 feet thick in a few sections and petering to nothing around the edges.

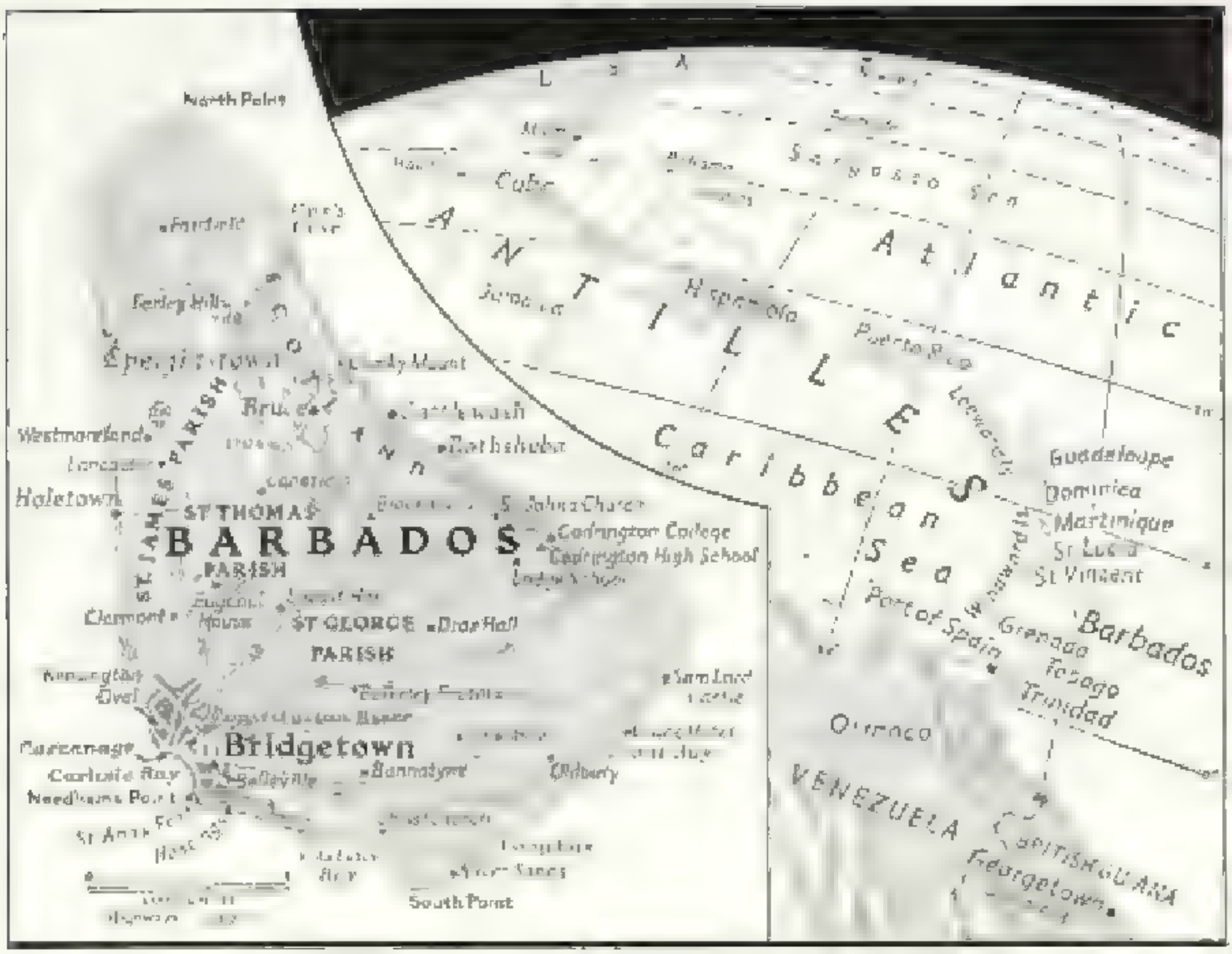
### No Erosion Problem

Rain, an average of 60 inches a year, falls chiefly during the rainy season from June to November. Instead of pouring off the surface of the land, however, carrying irreplaceable soil with it, the excess water sinks into the porous coral.

Here it percolates slowly downhill toward the edges of the coral cap, emerging in the coastal regions as bubbling fresh-water springs. Since this takes about six months, the springs are at their most productive during the dry season—just when they are needed most.

Layers of volcanic ash deposited from eruptions on neighboring St. Vincent and Martinique have helped to build up the soil. Two to three inches of volcanic dust fell over the island during the eruptions of 1902-3.

In St. George Parish I turned off the main




**Barbados, a Sugar Isle, Lies on the Rim of the Caribbean**

[illegible] Trade wind [illegible] Windward chain; sea creatures built Barbados with [illegible] on rare occasions lashed [illegible]

[illegible] and to visit Drax Hall [illegible] responsible for turning Barbados [illegible] sugar island. There is no record of when this fine old Jacobean mansion was built; tradition dates it at about 1650.

Other [illegible] Cornwall, Westmoreland, Lancaster, and Yorkshire [illegible] their English tradition.

Most famous [illegible] is Sam Lord's Castle (page 390). Built [illegible] when slave labor, it is now [illegible] luxury for honeymooning couples. As I climbed its black and white marble [illegible] soared upward at towering battlements surrounding the castle's thick walls. Inside, handsome plaster ceilings, mahogany [illegible] and 18th-century furniture brought visions of [illegible] gracious living of sumptuous banquets with plentiful wine and an ox roasted whole in the large hearth below the [illegible]

Mystery [illegible] Sam Lord in his lifetime and [illegible] rumors [illegible] that he was a fabulous character who gained vast wealth from [illegible] and [illegible] wrecked ships. After he became powerful in Barbados affairs, he crowned his success by erecting the castle high on the bluff.

In striking contrast to Sam Lord's Castle and other fine residences on Barbados are the tiny huts where the Negro population lives. Government-sponsored, low-cost housing developments have not yet replaced [illegible] which can be seen all over the island [illegible] in clumps, in long lines. They are [illegible] the houses a child [illegible] of wood [illegible] above the ground on a few rough stones, and roofed with rough shingles.

### Shutters Keep Out "Jumbies"

Such houses have shutters instead of glass in the windows. The Bajian Negro sleeps with firmly closed doors and shutters to keep out "jumbies" [illegible] glass [illegible] hot [illegible] night.

[illegible] saw some with three [illegible] and [illegible] four. Some houses

**Bridgetown Tea Vendor Wears a Spouting Hat** — **From Tap to Glass She Never Loses a Drop**

Small Schooners Crowd Bridgetown's Shallow Harbor — Big Ships Must Anchor Outside and Transfer Cargoes to Lighters

## Harbor Police Pay No Heed to Changing Styles. They Wear the Garb of Nelson's Sailors

[illegible]

**Bridgetown: Capital, Chief Port, and Largest City of Barbados**

[illegible]

**The Small Inner Harbor Occupies the Mouth of Chesapeake River**

[illegible]

**Sugar Is King on Barbados. Vacant Stands of Cane Cover More Than a Third of the Island**

[illegible]

Purchased Strains of Sugar Cane Grow Inside Glass "Lanterns" Which Wind-blown Pollen Cannot Penetrate

## Cockroaches and Spiders Survive Pesticides at Molasses

[illegible]

[illegible]

[illegible]

are brightly painted; many have neat flower gardens enclosed by picket fences.

More than once I met a house on the highway in the process of being "removed." Its walls were piled on a cart, one above the other, like pieces of a stage set. Roof shingles jostled about on the floor of the cart. The owner led the way, toting the front door on his head; behind followed a procession of friends and relatives bearing window shutters, doorsteps, and chicken coop.

### "Divorce House"—Cut in Two

A "divorce house" startled me even more. The dwelling, neatly sawed in two, told the sad tale of a broken home. The irate husband had carted away his half of the common property.

Generally flat, the island in the northeast presents rugged contours in the Scotland district. As I scanned this area from the crest of Farley Hill, a range of miniature mountains and diminutive peaks rearing skyward reminded me of a large-scale relief map.

Barbados is too small to boast lakes or rivers. Sumps in cultivated fields help drain the porous soil, and a plentiful supply of fresh water is pumped from a honeycomb of underground springs.

Geologists are optimistic about finding valuable deposits of oil in subterranean pockets. During the latter part of the 19th century so-called "Barbados tar" was exported. It is reported that in 1870 high-quality lubricating oil, obtained from crude oil from hand-dribled wells less than 100 feet deep, was exported to Russia, where it was valued for its low freezing point.

### Drillers Probing Deep for Oil

Today, Barbados Gulf Oil Company is making a thorough survey under a license covering approximately half the island. Exploratory wells to be drilled in 1952 may reach a depth of some 12,000 feet.

Tall-masted, bright hulled schooners from Demerara (now Georgetown, British Guiana), Martinique, Trinidad, Grenada, and "down the Islands" tie up at Bridgetown's careenage, or small inner harbor (pages 379, 383). The odors of molasses, oakum, sugar—the seaport smells of centuries—still linger over the busy water front.

Workmen trundle puncheons of molasses about in curiously designed rigs known as "spiders." Others plaster final seals on the wooden barrels before they are hoisted into lighters for transport to waiting ships (opposite page).

The doorsteps of old stone warehouses are receiving platforms for miscellaneous cargoes that include lumber, rice, coconuts, fruit. Firewood from near-by islands is a chief import. Often I paused to listen to dusky women dressed like Aunt Jemima haggle over the price of a bundle of sticks.

On the quays a vendors of peanuts, known locally as "courting nuts," carry on a brisk trade. Sweet drink and cane juice sellers are ever at hand to quench the thirst of the perspiring population.

"Mawberreeeee! Get yo mawbeeeeeeeee!" a vendor shouts.

"Mawberreeee cooooooooool! Who calling me?" her competitor shrills.

This sweet drink is brewed from the bark of the mauby tree. With deft hands sellers turn the taps of heavy urns atop their heads, and a stream of cold juice splashes into a glass. I never saw a mauby tea vendor spill a single drop (page 367).

Thirsty wharf workers also patronize producers of "raw liquor," fresh juice squeezed from sticks of sugar cane crushed in a small handmill.

### Oarsmen Wield 30-foot Sweeps

I watched sugar and molasses being loaded onto fleets of lighters which ply constantly between wharves and big ships anchored in Carlisle Bay. Husky oarsmen "bent to" on the 30-foot sweeps which propel the heavily laden craft. Best paid of all water-front workers, stevedores earn as much as $4.50 per day.

Natty harbor police in Bridgetown wear a uniform dating back to Admiral Nelson's day (page 369). Bridgetown, incidentally, honored Nelson with a statue in its Trafalgar Square, center of the island capital's public buildings, before London similarly recognized the great seaman (pages 370-371).

Bridgetown's founding was unique in the bloodless occupation of Barbados. In an island-scattering mood, Charles I, in 1627, gave all the Caribbean Islands to the Earl of Carlisle, whose friend, Lord Marlborough, was also interested in the scheme, though he shortly surrendered his claim to Carlisle.

Then the monarch evidently forgot or regretted his act. He gave Barbados to the Earl of Pembroke in 1628, and the Earl supported the claim of his protegé, colonizer Sir William Courteen (page 363).

Carlisle was incensed; he sent out an expedition and founded St. Michaels, now Bridgetown. Barbados became a center of contention between the two noblemen. Eventually the King decided in favor of Carlisle.

In 1663 the Carlisle patent was surrendered to the Crown.

The Barbados House of Assembly is the fourth oldest legislative body in the British Commonwealth. The trappings of tradition

**Savannah Club, Shrine of Polo and Horse Racing, Once Garrisoned Troops**

[illegible]

clothe the beamed chamber of the House. A bearded mace-bearer in an old tail coat, the gowned Speaker perched upon his dais and forth an atmosphere of [illegible] and [illegible] "[illegible]" of the House is Granley Adams, an Oxford [illegible] and a barrister.

The executive branch of Barbados's government is headed by Sir Alfred W. [illegible], a [illegible] of the British Colonial Service in [illegible] the Middle East, [illegible] South Pacific. He is the sixty-seventh governor of Barbados (page 384). His residence, Government House, was built in the 18th century and renovated about a hundred years ago. Admiral Nelson was a guest there in 1784. The estate near Bolle-ville, was known as "Pilgrim."

When I [illegible] Government House [illegible] Zouave uniform worn by attendants caught my eye. I was told that a similar uniform had been worn by a French colonial regimental band at the [illegible] liked it so much that she requested the uniform. [illegible] regiment in the British Army. [illegible] the drum and fife band of the Barbados Regiment wear the only colored garb at official functions (page 387).

Coral Limestone, Fresh from the Quarry, Saws Like Wood

[illegible]

### Regiment Mans 248-year-old Fort

Maj. M. L. D. Skeyes-Cox showed me 248-year-old St. Ann's Fort, the island [illegible] Bay. It is the only fort on the Island still [illegible] Barbados Regiment. [illegible] only 300, but it is being built up.

On an old map of Barbados dated 1782, Major Skeyes-Cox pointed out 26 forts which once lined the west and south coasts. North and east coasts had no fortifications, since landing there was considered [illegible] because of coral reefs and heavy surf.

The former quarterroom of St. Ann's is now the Savannah Club. Near by is the Savannah, an oblong of grass used as a parade ground and race track. Crowds cheer [illegible] for generations.

Some of the [illegible] have [illegible] Barbados (page 390). The island contributed six players to the West Indies team which [illegible]

**Thirty-foot Sweeps**
**Fish & Lighter [illegible]**
**at Provincetown Harbor**

Sails Rested, Deep-sea Fishermen Net a Barbadian Delicacy But Where the Flying Fishes Play

**Bridgetown Traffic Goes Left; Arcades Shelter Shoppers from Tropic Sun**

[illegible]

**Sunken Roads Elevate Cane Fields to a Convenient Truck-top Level**

This lane, like many others, has been scraped to bedrock [illegible]. Its natural surface is smooth but dusty. When near by cane has been gathered, the truck will [illegible] into the fields. Barbados's bumper crop in 1951 yielded enough to supply every person in the United Kingdom [illegible]

matches in England in 1950. In 1951, at Kensington Oval, I watched test matches between Trinidad and Barbados.

That day business firms in Bridgetown [illegible] doors at 11 a.m. [illegible] like that [illegible] in the United States [illegible] World Series. This test would determine [illegible] of the cricket stars who would invade Australia in the autumn as members of the British West Indies team.

### Advice from the Bleachers

Evenly matched elevens battled several days. When a batsman tipped the score for Barbados, an Englishman behind me quietly commended, "Well [illegible]."

Negro spectators were less restrained. When a star "Bajan" bowler was having difficulty getting the ball near the wicket, a spectator shouted from the bleachers, "Bowl de bad pun de wicket, mahn, or you ain't never goin' to see dem kangaroos!"

Pedestrians, automobiles, and donkey carts congest narrow Broad Street, main thoroughfare of Bridgetown. Bakers peddle bread and cakes from door to door, summoning regular customers with loud bugle blasts. [illegible]-chief-turbaned women in short skirts [illegible] baskets and trays of vegetables on their heads—exchange quips. Such scenes take place against a solid background of shops, offices, and banks (opposite page).

On Saturday nights the yellow flare of kerosene torches illuminates the shiny faces of hucksters squatting in closed doorways behind [illegible] of confections and vegetables.

One day as I carefully picked my way through Broad Street, I paused to ask directions to a business house.

"No, please, dis de wrong street. Turn left [illegible]," [illegible] the Bajan reply. Streets crossing a more important thoroughfare are called "gaps" in Bajan language.

In a balcony-shaded lane in Bridgetown I met a pig on a leash. The prospective bacon slithered toward the intersection as a barefoot shuffling Negro tipped his stiff straw sombrero in friendly acknowledgment of my curious

sture. A poker-faced Negro bobby gave them right of way.

Such a quiet and unorthodox encounter reflected the casual attitude of the West Indies, the genial humor of the Negro, and the easy economy of walking a home-grown pig to market.

Later I boarded the schooner *Margaret*, one of the few remaining "dreglers" which were once the chief means of transport between Bridgetown and Speightstown, a once thriving commercial center but now a quiet fishing village. Trucks have now largely replaced them.

The vessel's rig was one I had never seen elsewhere. An exaggerated bowsprit stretched more than half the length of the 55-foot schooner, supporting a mass of sail well adapted to conditions on the leeward coast but ill suited to deep-sea sailing.

Despite their clumsy appearance, the vessels are unusually fast. We made the 13-mile trip in just over 90 minutes—only moderate time, the skipper told me.

As we neared the Speightstown dock, a wharf hand was slow to toss in a forward line. Our skipper, one foot on the dock and the other on the schooner's rail, quickly found himself "spread-eagle." A second later he hit the water with a gigantic splash, while laughter convulsed villagers and crew.

### Old School Tie in Barbados

The island's schools have long been among the best in the West Indies. Boarding schools—Lodge School for boys and Codrington High School for girls—attract students from Venezuela, Trinidad, Grenada, and most of the Caribbean's Windward and Leeward Islands.

Codrington College, founded in 1710, is the oldest college in the West Indies and takes pride in its tradition. Affiliated with Durham University, it grants an English degree. Codrington alumni include many prominent citizens of the Caribbean colonies.

Barbados provides excellent medical facilities. Experienced surgeons and physicians staff its hospitals. Last year four Negro girls, studying to be nurses, journeyed as far as Maidenhead, England, to take training. Malaria is almost unknown on the island.

One day I turned off Highway No. 2 in St. Thomas Parish to Edgehill House, residence of genial Sir John Saint, director of Barbados's recently established Sugar Technology Research Unit.

As Director of Agriculture during World War II, Sir John was largely responsible for putting into effect agricultural practices which staved off starvation for the densely populated isle. Before the war, only about five percent of the arable acreage was planted in food crops.

Sir John required all landowners to devote 35 percent of their land to vegetables. To take care of seasonal surpluses, a dehydrating plant was built for drying food crops.

As the war proceeded, the importation of meat dwindled, and early steps were taken to control local supplies. An order forbade the slaughter of breeding and young stock. In addition, plantation owners were required to keep numbers of livestock of specified kinds.

In 1950 John Saint was knighted for this great service to the island of Barbados.

### Try a Flying-fish Pie

Because of wartime protein shortages, the island's fishing industry made a big comeback. On my first day in Barbados curiosity prompted me to order flying-fish pie. The novelty soon abated, however, for flying fish were listed almost daily on hotel menus.

From the open-air dining room of my seaside hotel I watched sailing craft of Bridgetown's flying-fish fleet make for the fishing grounds, 5 to 25 miles offshore. Later Dudley W. Wiles, Barbados fishery officer, invited me to join him on the Department's experimental boat, *Investigator*, a 43-foot Diesel-powered craft.

On our way out we passed occasional fishing boats. Carrying a crew of three, the 22-foot vessels leaped over the sea in a shower of spray, making excellent time.

These small craft sometimes venture as far as 27 miles offshore; sometimes they spend the night at sea. Fairly well suited to their purpose, they are light, fast, and keelless. They are also dangerous. Ballast, usually chunks of scrap iron, is kept inside the boat and shifted according to the wind.

"Quite often," Wiles told me, "ballast is piled up on one side, and a back wind comes and capsizes the boat, which quickly sinks. A better type of boat has been designed, but it's too expensive for the average fisherman."

When we had been out about 20 minutes, Wiles dropped a collector overboard to gather plankton. These minute sea organisms are the staple food of flying fish.

Hauling the collector aboard, Wiles showed me an exhibition of plankton. On the gauze I saw small pink blobs finer than grains of sand, some even more minute specks, and other relatively large and colorless splotches. Under the microscope the pink dots looked like tiny lobsters, the green ones like gems.

"Clumps of moss guide fishermen to schools of flying fish," Wiles said, "but plankton is more reliable. I hope to get permission soon to make radio announcements telling fishermen where the fish can be found."

**Tiny Ship, a Salvaged Gets Repairs in the Cleanage, Bethlehem's Inner Harbor**

[illegible]

Caribbean and Atlantic Combers in Tireless Surges Beat Against the Islands Coral Cliffs

Barbados Mounties, Astride Canadian Horses, Line Up for Spit-and-Polish Inspection

## Princess and Arms Concrete in Dazzling Dress

Sam Lord in 1820 Built His Castle with Slave Labor. Now the Public Uses It as a Hotel

[illegible]

We were offshore some eight miles when *Investigator* hove to. I counted 10 boats with masts and sails down, drifting on the fishing grounds netting fish.

Flying fish bait must be smelled to be believed. Fish entrails and land crabs several days dead are put in a small, loosely woven basket. A crewman continually dips, or churns with, his bait basket, attracting scores of the mother-of-pearl-colored fish to the surface. Other crewmen dip them from the sea in hoop nets (page 379).

"On a good day," Wiles said, "a boat may bring in 8,000 to 10,000 fish."

### Fishermen Sometimes Swim Home

Next day at Speightstown, Silver Sands and Bathsheba, I watched returning boats. At Bathsheba a number of the vessels capsized while negotiating the narrow channel. Then fishermen had to swim home.

Crowds of housewives, summoned by the fishermen's conch shells, thronged the white sandy beaches to haggle for fish.

White sea eggs—known in northern climes as sea urchins—are in season in Barbados in months that have an R. They cluster on rocks and reefs in shallow water curious balls of spines, about the size of a baseball.

To prepare sea eggs for market, fishermen crack them open on the beach and wash out the muck. The "roe" sticks to the sides of the shell in strips about half an inch wide, each containing thousands of tiny yellow eggs. After being washed, these are taken out and the contents of several shells are used to fill one to overflowing. The leaf of the sea grape serves as a neat little cap. Filled shells are packed in wooden trays.

I learned to like sea eggs for breakfast, steamed or fried with onion and butter.

Incidentally, "breakfast" on Barbados is really lunch, served from 11 a.m. until noon. The first meal of the day is more like a tea, which can be ordered almost any time.

Many Barbadians choose the Bathsheba coast for week-end holidays (page 365). With Aubrey Boyce, a retired Trinidad businessman who lives in Barbados, I headed for this area one Friday morning. We drove on the left-hand side of a major road, sometimes overtaking rickety pony and donkey carts.

At intervals buxom women waited for the brightly colored buses which bowl along the sunken coral road toward Bridgetown. About 150 of these vehicles carry the burden of island transportation.

Occasionally we looked up at fields on either side of us. Boyce explained: "In old times roads were mended by scraping them to level out potholes. As a result, the whole surface sank lower and lower. The seemingly airless winding follows tracks made by animals and pedestrians perhaps three centuries ago."

We passed a quarry where workmen hewed blocks of coral limestone from a cliff. The coral polyp has built much of the stone used in the island's houses. Later I saw builders cutting similar blocks with handsaws in erecting a modern coral limestone house (p. 377).

A mile or two from the Atlantic coast the road began a tortuous ascent. Tiny cottages of the natives hung on the hillsides. Bread fruit trees and banana plants suggested the Tropics, although the whole sea front in this part of the island has aptly been termed a miniature Cornish coast.

Before teatime we paused to watch a cricket match on a narrow strip of grass. A ball hit into the sea meant four runs, the equivalent of a home run in baseball (page 388).

Along the Bathsheba coast live descendants of the "Red Legs," staunch Irish, Scottish, and English Royalists deported to Barbados by Cromwell in unsavory convict ships in the second half of the 17th century. Theirs was a heritage of woe. Many were sold as white slaves for 1,500 pounds of sugar per head.

Unused to long hours in the sun and grueling field labor, the majority died. Their nickname came from their sun-reddened legs, for many wore kilts. Small wonder that with their bitter tradition they scorned their neighbors, marrying only among themselves.

The Church of England is dominant in Barbados. In the church at Holetown, on the St. James coast, I saw one of the oldest church bells in the Western Hemisphere, inscribed "God Bless King William 1696."

Another old church on the Bathsheba coast is St. John's. In its cemetery I found the obscure grave of Ferdinando Paleologus, "descendent from ye imperial lyne of ye last Christian Emperors of Greece." He died in Barbados in 1678.

### Sunday, Not Saturday, Is Bath Day

Sunday is bath day for Barbados animals. At Silver Sands I saw balky donkeys prodded to the water's edge for their weekly scrubbing. Goats, too, are soused. Cattlewash, a village on the Bathsheba coast, owes its name to the act the word implies.

A pair of monkeys skipped across our path near Farley Hill, possibly out to raid a yam patch. Sweet potatoes, eddoes (a member of the taro group), maize, pulses, and cassava form staple food crops on the island.

Practically all the families living on the barren hilltops of Chalky Mount make pottery from the plentiful supply of good clay at hand. One amiable potter invited me to see his workshop. A small boy squatted on

**Coral Limestone Builds Fine Houses; Thick Walls Keep Them Cool**

[illegible] (sitting), an American, came to Barbados [illegible]

[illegible]

[illegible] Barbados [illegible]

[illegible] the sun.

[illegible]

[illegible]

# Finding an "Extinct" New Zealand Bird

## Rediscovered by a Persevering Doctor, the Flightless, Crested Takahe or "Wanderer," Struggles to Survive

By R. V. Francis Smith

In New Zealand's rugged Fiordland a bird thought extinct for fifty years is struggling for survival. Behind the rare species in its fight for life is all the protective power of the Dominion Government.

Rediscovery of this flightless bird, the large, brilliant-hued native rail which the Maoris called *takahe*, meaning "wandering at large," excited almost as much interest in New Zealand as discovery of a living passenger pigeon would arouse in America.

To zoologists and bird lovers throughout the world, reappearance of takahes, now called the takahe, was a notable event. They had a scientific name for the creature—*Notornis hochstetteri*, the first half of which means "bird of the south"—but they knew tantalizingly little about it and had considered it lost in the limbo of vanished species.

To the rediscoverer, Dr. G. B. Orbell, a physician of Invercargill, New Zealand, the dramatic sight of a takahe alive came as the reward of years of patient and systematic search. Only four of the birds were known to science when he made his discovery on the shore of a lake in what is now called Notornis Valley (map, page 394). Since August, 1898, there had been no authentic report of one being caught, or even seen.

### Futile Wings Have Three-foot Span

A primitive type of large rail has found only in New Zealand, the takahe is unlike any other member of the world-wide rail family to which it belongs. For example, despite its membership in an aquatic family, it avoids swamps and rivers. It does, however, share some of the clan's characteristics, such as a large frontal shield (page 396).

The full-grown takahe stands some twenty inches high and weighs about six pounds. The wings, though incapable of flight, may have a three-foot span.

The adult bird is vividly colored. Head, neck, breast, and flanks are an iridescent indigo blue, becoming brighter on the shoulders and changing to a malachite green on the mantle. The dark rump and upper tail coverts are olive green, the abdomen and thighs purplish black, and the under tail coverts white. The powerful beak is scarlet at the base, fading outwards to a wax pink. Legs and feet are red, eyes reddish brown.

This brilliant color scheme is seen to full advantage only when the bird is approaching the observer or passing at right angles to him.

In contrast to its showy parents, the young takahe wears only a uniform, soft black down (page 395). The black beak is white-tipped, and the disproportionately large legs are a pale purple.

In New Zealand's ornithological history, extinction, or near extinction, has been the lot of many species as a result of settlement.

Originally, native birds had no enemies, and the vegetation which affords them cover was not subject to browsing by animals. Under these favorable conditions many unusual forms of life, including birds of little or no power of flight, were able to survive and thrive.

### Vanished Birds Include 12-foot Moa

Before the arrival of Capt. James Cook in 1769, birds were the dominant land vertebrates. The only land mammals were the dog, a Polynesian rat, and two species of bats. The dog and rat had been introduced by the Maoris on their second migration, about A. D. 1150.*

After the Maoris had caused the extinction of the huge flightless moa, one species of which was twelve feet high, European settlement brought about more extensive changes. Ferrets, stoats, and weasels were introduced to control a plague of rabbits, and these, with cats, dogs, and other predators, virtually sealed the fate of numerous native species, among them the takahe.

The first living takahe known to Europeans was purposely killed and eaten. It was caught by a sealing gang on Resolution Island, near the southwest end of South Island, in 1849. Two years later a party of Maoris caught a second bird in Thompson Sound about forty miles farther north.

Luckily, the skins of both birds were obtained by Mr. W. D. S. Mantell, who in 1847 had discovered the semifossil remains of the North Island variety (duly named *Notornis mantelli* by Sir Richard Owen, of London). The skins were sent to the British Museum.

Twenty-eight years passed before another specimen appeared. A rabbiter's dog caught it near the south end of Lake Te Anau. The bird was destined for the cooking pot when

* See, in the NATIONAL GEOGRAPHIC MAGAZINE: "The Columbus of the Pacific: Captain James Cook," by J. K. Hildebrand, January, 1927, and "Tuatara 'Living Fossils' Walk on Well-Nigh Inaccessible Rocky Islands off the Coast of New Zealand," by Ineda Cobb Blanchard, May, 1935.

Long-lost *Notornis hochstetteri* came to its home in remote Murchison Valley where the flightless bird was rediscovered beside this nameless lake

Image by Jackson E. Raymond and Jack J. Jones

**New Zealand Finds and Shelters the Takahe, or Notornis, a Bird Long Thought Extinct**

Notornis, 1 ft. [illegible] Mantell's Moorhen [illegible] the takahe from human sight for decades. From boyhood Dr. G. B. Orbell, an Invercargill physician, refused to believe the creature lost. After thirty years his quest succeeded, Dr. Orbell traced the takahe to the scene of its last stand in one of the wildest parts of the Dominion (pages 393, 397, 401).

it was rescued by a farm manager and eventually sold to a museum in Dresden, Germany, for £105.

After close examination, Dr. Adolph B. Meyer of the Dresden museum found that this bird was sufficiently different from the North Island semifossil form found by Mantell to warrant a distinct name. Accordingly, the name *Notornis hochstetteri* was given the present species.

The fourth specimen was caught by a dog on the shore of Middle Fiord of Lake Te Anau in 1898. The bird was bought by the Government for £250 to ensure that it remained in New Zealand. Preserved in the Otago Museum at Dunedin, it still is the only mounted specimen in the country, for no more takahe were known until Dr. Orbell's discovery.

### A Thirty-year Quest Begins

Dr. Orbell's interest in the creature began more than thirty years ago when, as a boy, he found an old photograph showing the museum bird in a case. His mother told its story and explained that the bird was supposed to be extinct.

That word "supposed" stimulated Dr. Orbell's adventurous spirit, and he learned all he could about the species. From game [illegible] the fastnesses of Fiordland from hearsay and from stories told around campfires on numerous hunting trips, Dr. Orbell picked up fragments of information about possible takahe nesting places.

In 1948 Dr. Orbell built a summer home at Lake Te Anau, where two of the birds had been caught. The question of the takahe's existence and whereabouts was always with him, but he seldom mentioned the matter except jokingly or as a bait to catch information. In this way he learned that a man who knew the country round about always carried his rifle loaded when in a certain area.

"It might be worth £400 to £500," the man said with a knowing air.

By plotting any references to the bird on a map tacked up in his summer home, Dr. Orbell found that the area surrounded by reports [illegible] least explored in the country. In each case the bird was claimed to have been seen on

**A Young Takahe Is All Legs, Beak, and Fight**

[illegible]

[illegible] heavy snowfalls.

Dr. [illegible] lake [illegible] from the air, that was [illegible] on the maps. Maori history [illegible] its existence and [illegible] the Maoris [illegible] the lake.

[illegible] Lakes Manapouri and Te Anau [illegible] mountainous [illegible] The [illegible] story [illegible] the birds for food when the [illegible] of winter [illegible]

It was in April, 1948, that Dr. [illegible] and [illegible] first made their way into the [illegible] area. [illegible] they found themselves [illegible] below a lake [illegible] Beyond the lake [illegible] extended for several miles [illegible] among the peaks.

## Notes Heard, Footprints Found

There was little time [illegible] before turning back [illegible] but it was long enough for Dr. [illegible] to hear [illegible] and to see large prints at the lower end of [illegible]

* See [illegible] New Zealand [illegible] by W. Robert Moore [illegible] April, 1948.

## Eaglrass, the Rooster-size Bird Moves East on Big Feet

[illegible]

## A Hen on Her Nest Keeps Wary Eye on an Intruder

[illegible]

**Only Accredited Observers May Enter the Bird's Grassy Haunts in Notornis Valley**

[illegible] New Zealand [illegible]

the lake where he stopped to camp for the night.

With several reconstructions of the prints sketched on the [illegible] of Dr. Orbell's paper, the party returned home. They submitted the evidence to other New Zealand ornithologists, but the experts could not agree. Dr. R. A. Falla, Director of the Dominion Museum, who later led a number of expeditions to study the bird, thought it might be that of a takahe; another expert considered it the print of a [illegible] heron.

On November 20 of the same year the party again entered the valley, armed with cameras and 50 yards of fishing net.

### Takahe Caught at Last

The [illegible] route led up [illegible] slopes and through dense beech forests [illegible] with brambles. Ferns, moss, and moss-covered rotting tree trunks gave under foot.

Not 20 yards from where the tracks were seen the April before, the doctor again saw [illegible], and then the first takahe!

Seconds later, as the [illegible] camera [illegible] had no more chance than a [illegible] a few yards away.

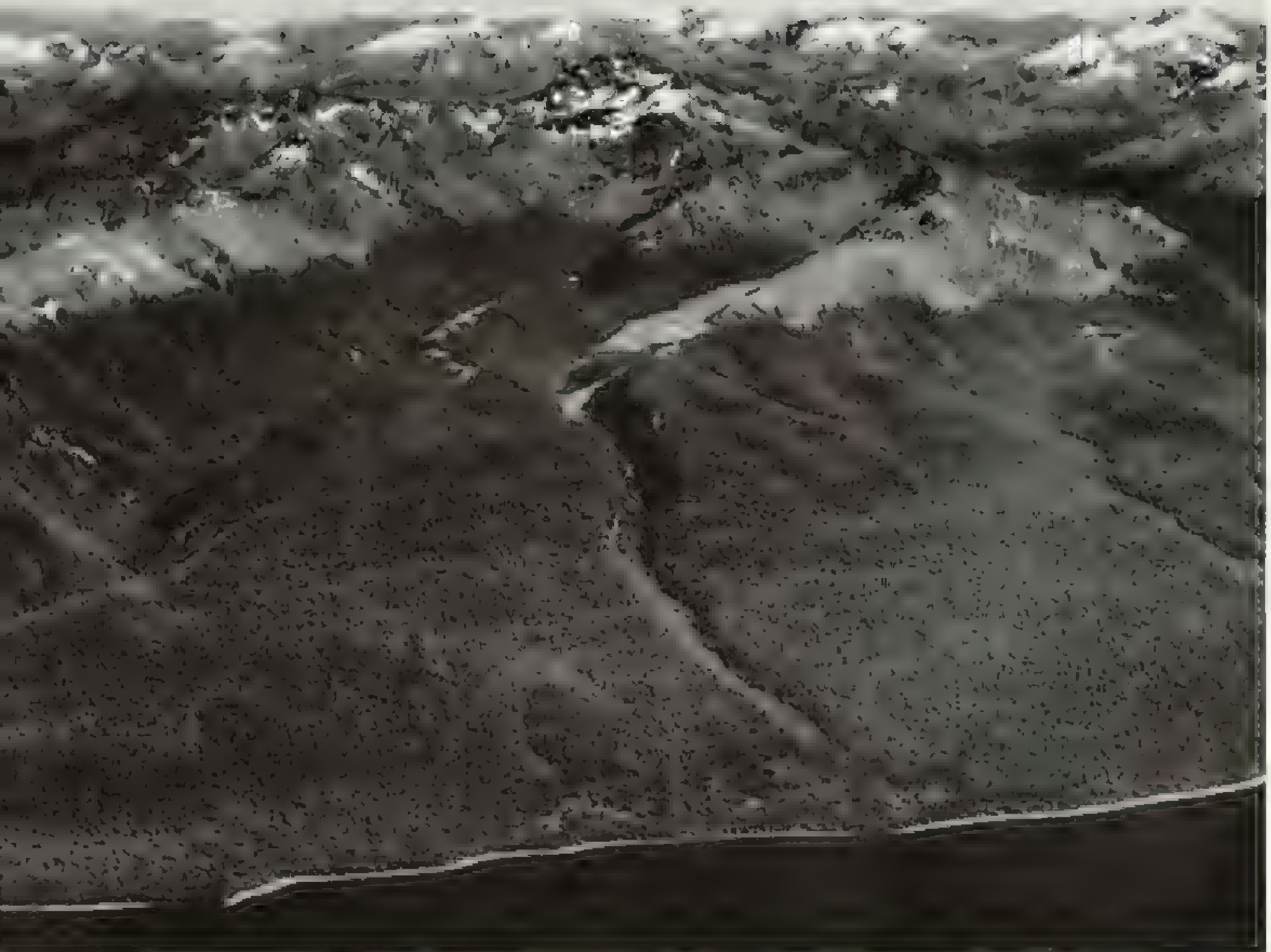
Quickly the net was drawn about the birds. The elusive takahe had been caught at last.

The men gently carried the birds [illegible] to the lake shore and [illegible] them [illegible] After [illegible] taking the takahe were released [illegible] in the tall grass. A third bird ran off toward the forest [illegible] and squawking, for an hour.

Since 1948 six expeditions have bushwhacked into the [illegible] zone [illegible] to all but accredited scientists and other investigators working under the aegis of the Department of Internal Affairs. New colonies have been discovered in adjacent areas [illegible] south of Notornis Valley [illegible] a small population [illegible]. Much has been learned about the species, and conservation measures have been [illegible].

So far as is known, the takahe is confined to the rugged Murchison Mountains west of Lake Te Anau (page [illegible]). The main colony survives in a hanging valley with an altitude of 3,000 feet rising at its head to 4,000 feet.

From fossil and [illegible] remains it is known that the South Island takahe once ranged throughout the lowland, north and south parts of the island, and it is interesting to note that in each case the remains were found in low country. As the birds knew no



## Takahe Fights for Life in This Wild Setting

[illegible]

[illegible]

*Kahatu-takahen*, "Nesting Place of the Wanderer," Maori's Called the Lake in Lonely Nevernis Valley

enemy before the arrival of the Maoris and Europeans, settlement probably caused its retreat to mountain heights.

The Notornis (or Takahe) Valley, as the main valley is called, is only three miles long and at most a quarter of a mile wide. At the lower end lies the moraine lake, girt on three sides by tussocks of snow grass (page 390).

Although the adult takahe appears to be mainly herbivorous, [illegible] somewhat with the seasons. When obtainable, the succulent bases of snow grass and sedges seem to be favored.

At times during the four months of winter, when deep snow covers the ground, the birds are forced to move to the forest. There they eke out the available supply of snow grass with the tender parts of shrubs, mosses, and possibly insects.

For eight to ten days after hatching, the diet of the chicks includes insects, but by the time they are a month old they appear to be vegetarians. At this age they still have not fully learned the adult method of feeding, but merely pick at tender shoots and leaf bases protruding from the beak of the parent.

### An Acrobatic Eater

The feeding habits of the adult birds are fascinating to watch. By one method, the bird climbs into a clump of snow grass and runs its beak along the stems, stripping the seed heads. It may slide off taller tufts, garnering seeds as it drops.

To pluck shoots both of Carex (a sedge) and snow grass, Notornis takes firm hold of the plants near the ground with its beak. A quick pull usually suffices to pluck a sedge shoot. When feeding on snow grass, however, the bird makes a strong upward swing, using the heft of its body as a weight lifter would.

Such a fibrous diet causes the bird's droppings to be easily distinguishable from those of all other birds. This peculiarity, together with the mass of discarded snow grass stems, offers unmistakable evidence of the takahe's presence, even to the most casual observer.

An interesting characteristic of the bird is its sense of property. Each mated pair ranges freely within what appears to be a fairly well-defined feeding territory.

The quiet chirps of a contented feeding pair are quickly broken off at the suspected presence of a third. Chirping changes to a series of rhythmical booming cries—"ker-loom, ker-loom!"—which seem to be a combination of alarm and warning to any trespassers. The calls, coming from each bird in turn, rise in tempo for about 30 seconds and stop as suddenly as they begin.

Adults summon their chicks with a single repeated note, "cowp-cowp-cowp." When a pair is separated, one screams "kee-ew," the other answering with a single "kaa."

The takahe flicks its tail up and down with almost every step. It runs swiftly, with a free-and-easy gait like a good trotting horse.

The three- to four-month nesting season begins in October (spring in the Southern Hemisphere), when every pair prepares a number of nests, each consisting of a grass bowl with at least two entrances, set between thick snow grass tussocks (page 396). The last to be made is apparently chosen for actual egg laying, and either one or two cream eggs flecked with light purple and brown spots are laid (page 397).

Within three or four days the hen begins sitting, and during incubation seldom moves more than 60 or 70 feet from the nest. Although well camouflaged itself, a nest can easily be located by the heavy feeding signs and the mass of droppings near by.

### Beset by Many Dangers

To give the takahe every chance of survival, agents of the Department of Internal Affairs are trapping, shooting, and snaring stoats, weasels, hawks, and other predators. Some control of wandering deer that imperil nests and eggs may be necessary.

But other factors—the infertility of the species, the severity of winters, and the availability of snow grass for feeding and nesting—seem beyond human control. Bush fires may easily run wild and destroy the birds, which cannot fly to safety.

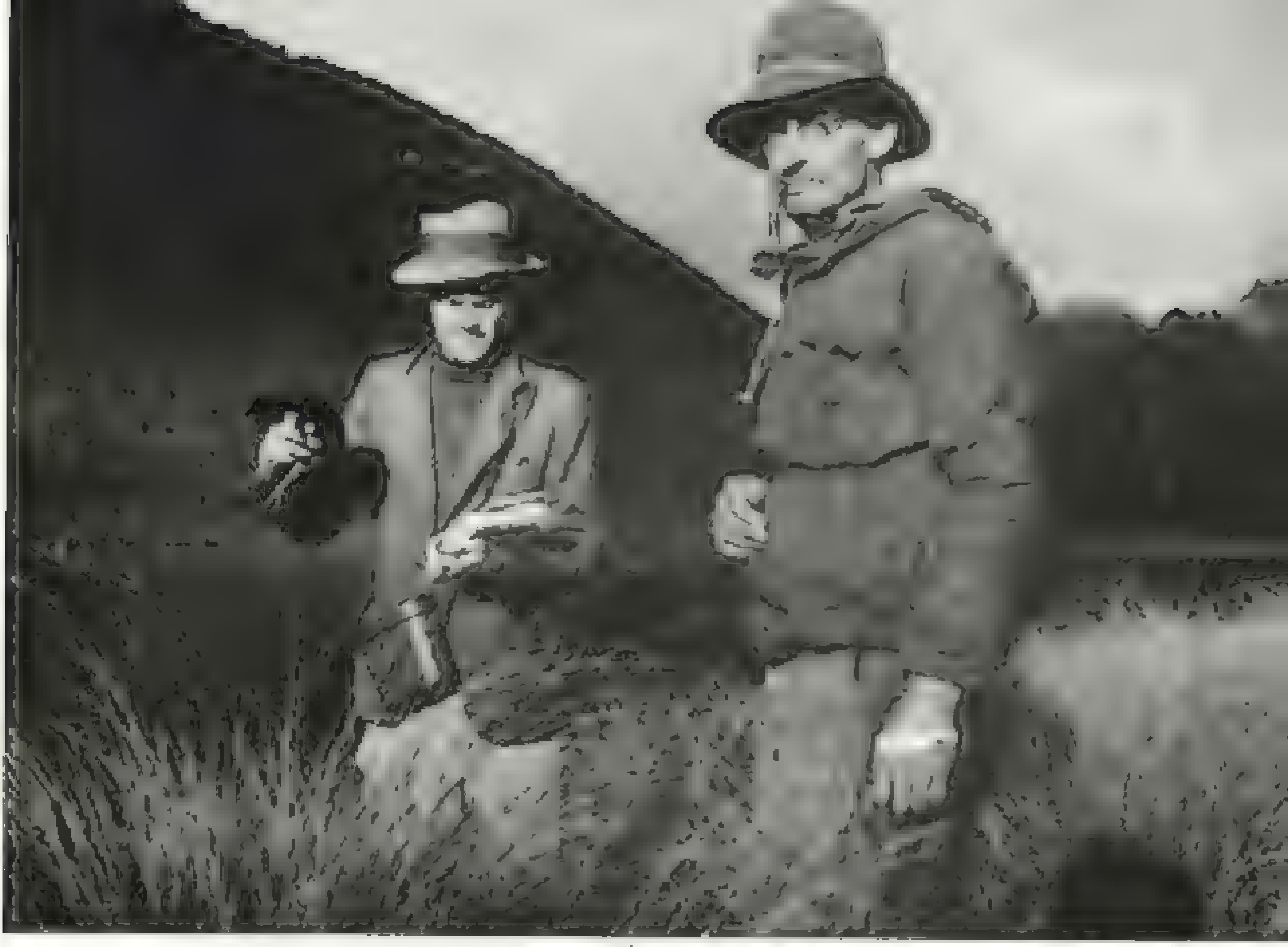
The history of the American heath hen is a graphic example of the decline and extinction of a species, with a parallel, perhaps, in the takahe. Once abundant in Massachusetts and probably much more of New England, the heath hen was driven eastward by hunting and after 1870 appears to have been restricted to Martha's Vineyard.

From 1890, when the heath hen population was estimated at 200, there was a slight decline until 1907. With sound conservation measures the number increased to about 2,000 by 1916, but in that year a combination of factors reduced the population to fewer than 150 birds, most of which were males.

Again the numbers rose slightly until 1920, when a steady and inexorable decline set in. By 1928 only one bird could be found; it was seen for the last time in 1932.

As the case of the heath hen demonstrated, when a species is reduced to a very low number, fertility may fall off sharply. Biologists recognize this fact, although they do not yet fully understand the reasons.

At present, estimates of the total number of takahe vary from 30 to 100, compared to



**Dr. Orbell (Right) Brought the Takahe Back to Human Ken**

[illegible]

about [illegible] of the American [illegible] when [illegible] contraction of that ill-fated [illegible].

The [illegible] remaining takahe form several colonies, the largest of which has only about ten breeding pairs. The infertility danger [illegible].

### Severe Winters Limit Food

From observations over three nesting seasons [illegible]

food during severe winters, when the [illegible] deeply covered with snow, is an important [illegible] [illegible] death.

[illegible] these contemporaries of New Zealand's [illegible]

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**INDEX FOR JULY–DECEMBER, 1951, VOLUME READY**

Index for Volume C (July–December, 1951) of the National Geographic Magazine will be mailed upon request to members who bind their copies as works of reference.

Farm Sheds Dwarfed Terraces of Rock and Rubble Down The Assam Hillside

1. [illegible]

# Caught in the Assam-Tibet Earthquake

## Record Shocks Dam two Rivers, Split Mountains and Trap Botanists in Rock-strewn Devastation for Three Months

By F. Kingdon-Ward*

*With Illustrations from Photographs by the Author*

DARKNESS had fallen over the upper Luhit Valley in rugged far-eastern Tibet. Our simple evening meal was finished; my wife was already in bed.

Near by our two servants were sleeping peacefully in their tent. I was seated near the entrance to ours writing in my diary by the light of a hurricane lamp. I glanced at my watch; it was 8 o'clock.

Suddenly a most extraordinary rumbling noise broke out, and the earth began to shudder violently. Shattering the dead silence of the night in that remote mountain retreat, the ominous rumble swelled to a deafening roar. It was as though the keystone had fallen out of the universe and the arch of the sky were collapsing.

Alarmed, bewildered, but also curious, I sprang up and thrust my head between the tent flaps. The night was black, for there was no moon, but I remember seeing a dark ridge silhouetted against a planet-powdered ribbon of sky become fuzzy for a moment. The whole bristling edge of forest was shaking violently.

My wife leaped out of bed shouting "Earthquake!" I seized the lantern and together we rushed outside, only to be thrown immediately to the ground. The lantern went out.

A dozen yards away our boys were crawling out of their tent. We yelled to them to join us, and although they had not heard our shouts, a minute later they crawled across to where we lay.

All four of us held hands and lay flat, waiting for the end.

### Earthquake Roars to a Climax

My first feeling of bewilderment had given place to stark terror. These solid mountains were in the grip of a force that was shaking them as a terrier shakes a rat. Yet, frightened as we were by the dire and violent earth tremors, we spoke quite calmly to each other.

The earthquake roared on. Something was pounding the ground beneath us with the force of a giant sledge hammer. Our once-solid ground felt like no more than a thin covering stretched across the valley floor and attached by its edges to the mountains. It seemed that the very foundations of the world were breaking up under the violent blows, that the crust on which we lay would crumple like an ice floe in a rough sea and hurl us into a bottomless pit.

Besides the roaring of the earthquake itself there was another more familiar sound—the crash of rock avalanches pouring into the valley on every side. The mountains themselves seemed to be falling into the gorge as cliffs broke in half and boulders poured down a hundred scuppers with a clatter and a rumble.

Not far from our camp the mountain rose steeply for hundreds of feet to a higher terrace. Surely the slope would give way and we should be crushed to death or buried alive.

But presently the battering ceased and the noise died away except for an occasional avalanche. Then without warning came four or five sharp explosions in quick succession, seemingly high up in the dark sky. They sounded like ack-ack shells bursting. It was the coup-de-grâce; everything became quiet, and the madness was over for a while.

The initial shock had lasted only four or five minutes. It had seemed an eternity.

### Floods and Landslides Bury Villages

Returning to our tent, I noticed that my traveling clock was on the table and ticking, the altimeter still registered exactly 3,000 feet, and the thermometer showed 73° F. Nothing inside the tent was disturbed except a glass of water that had been upset.

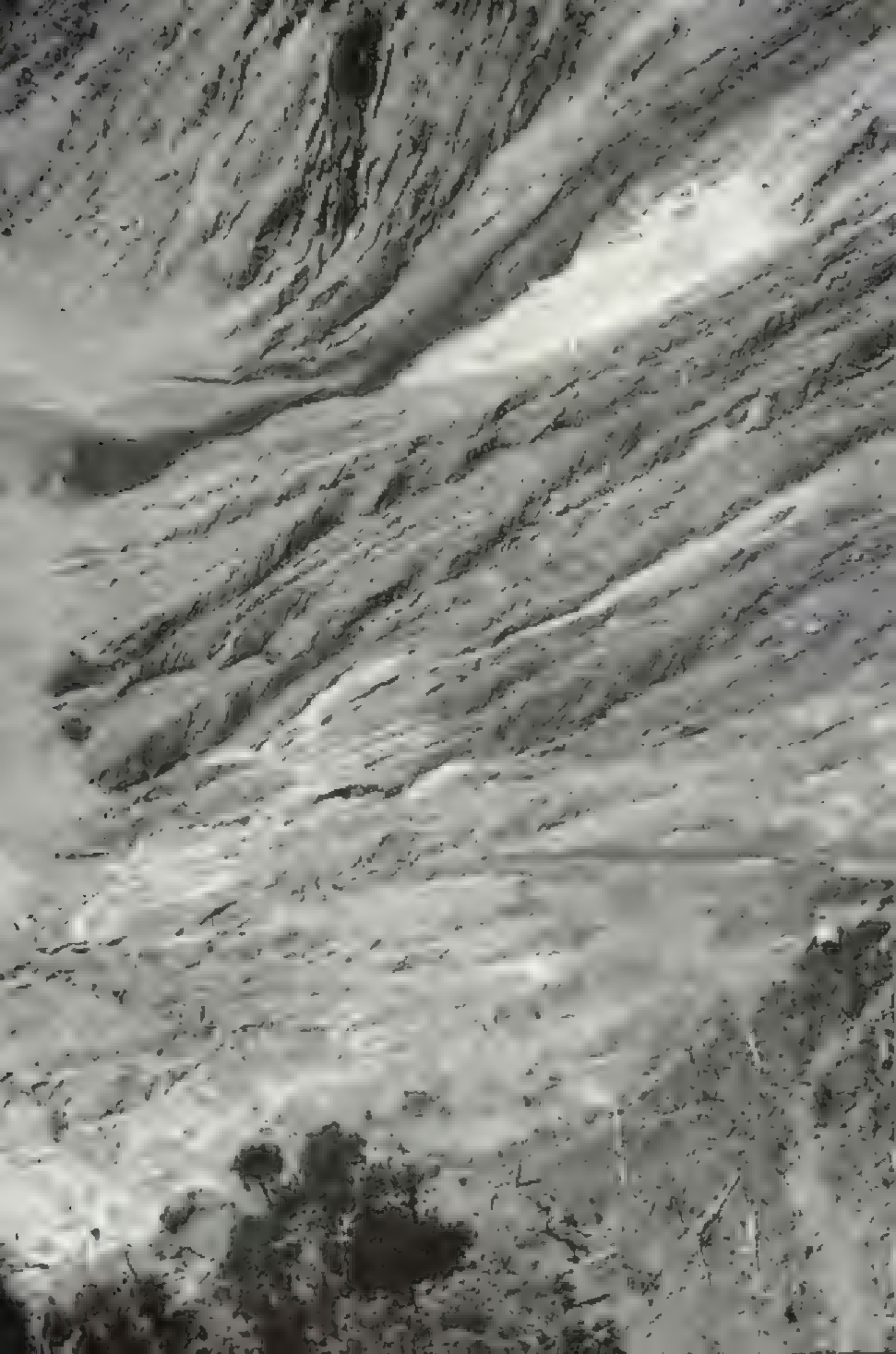
Luckily the steep slope near our camp had not slipped badly; at any rate, no boulders or slides reached us. Apparently we could not have selected a safer site.

Not until weeks later did we learn the magnitude of the earthquake. Over thousands of square miles it created utter havoc. All communications were disrupted. Avalanches buried whole villages and flung rock dams across rivers. When the dams burst, devastating floods raced down valleys, sweeping everything in their path.

Fortunately, in this sparsely settled region the loss of human life, though in the hundreds, was surprisingly small for such an upheaval. Stock died by the thousands.

Seismologists whose instruments all over the

* The author, a British scientist and explorer, has published numerous books and articles on plant hunting in southeastern Asia, including China, Burma, Tibet, Assam, and the Himalayas.



## Deep Scars Gently a Mountainside Where Village and Forest Stood

[illegible]

## ✦ Frequent Tremors Rock the Himalayas

[illegible]

A Rima Mother Washes Her Child in a Mountain Stream

[illegible] The youngster [illegible] camera.

[illegible] calculated that the epicenter of this [illegible], 1950, lay along the border between Assam and Tibet [illegible] on the outskirts of the Tibetan village of Rima (map, page 405).

Earthquakes are frequent in this region. It lies in one of the earth's two great belts of seismic activity, which extends from the Mediterranean across southern Asia. The other [illegible] Pacific Ocean.

[illegible] it is probable that the forces which [illegible] when [illegible] the Himalayas [illegible] as the Great [illegible] at the eastern end of the Himalayas where Tibet, Assam, and Burma meet.

As the [illegible] crust [illegible] the rock [illegible] crust, or [illegible] mass [illegible] slipping [illegible]

sets up the vibrations felt in an earthquake.

Even a small amount of ground movement can cause severe damage, especially in a region of steep mountains where masses of rock and earth can easily be dislodged.

The magnitude of the earthquake was [illegible] on the [illegible] Richter scale used by seismologists. It is believed to have been at normal depth, about nine miles below the earth's surface. No stronger earth shock has been recorded since the use of seismographs for measuring them became general about the turn of the century. Only one other in the past 50 years was of equal magnitude, that in Colombia in 1906.

### Rendezvous with an Earthquake

My wife and I had traveled far to keep our unwitting rendezvous with one of the world's severest earthquakes. Our purpose was to gather botanical specimens high in the Himalayas for the Natural History Museum in London.

During the past 30 years I have been engaged in studying plant life in the remote mountain country of southeast Asia. [illegible] explored, yet it is of particular interest, since the wild ancestors of many of our present food crops came originally from this part of the world.

Our object was twofold. First, we wanted to make at least a partial survey of the flora of this region to link it into the plant geography of Asia and the world as a whole. Second, we hoped to collect seeds of alpine plants which might prove successful for cultivation in western gardens.

* [illegible]

† [illegible]

Months before the catastrophe, we had arrived in Sadiya, our expedition's jumping-off place in India's northeast Province of Assam. Following the Lohit, a wild, impressive mountain river, we hiked across the formidable Mishmi Hills—noted for their great emptiness, unfathomable gorges, rain-drenched forests, and narrow passes—to the Tibetan frontier. We arrived at remote Rima, a cluster of small villages a day's march inside the border, in time to help celebrate the Tibetan New Year with wrestling bouts, and pony races.

### After Chaos, Business as Usual

Early in April, when mountain snows began to retreat before the sun's waxing strength, we undertook the first of a long series of field trips to high alpine pastures. Fortunately, when the big earthquake [illegible] Sunset, I was were back at our headquarters near Rima.

**Avalanches Fired Stone Projectiles into Trees**

In Rima [illegible] the author crouched against a huge white stone [illegible] overhead. Flour rocks embedded themselves in the plow (page 414). Other trees were toppled

There was not much sleep for anyone that night. I [illegible] only for a few hours, my wife not at all. Violent tremors succeeded one another at intervals; stars dimmed and went out as a vast curtain of dust veiled the sky.

A song like that of a blackbird roused me at dawn. Then came the raucous cry of a small boy scaring birds away from the crops in a nearby field. When presently a procession of women and girls filed out of the village on their way to work in the [illegible] it was apparent that the world was not yet completely topsy-turvy.

[illegible] and went out. This very morning we had planned to be on our way up the Lat Te River, a swift torrent tumbling down from the Burma frontier into the Lohit. But overnight the Lat Te had changed from a blue-green crystal stream to a raging flood of liquid mud.

Rising some four feet, the rock-filled river had smashed several small water mills along its bank. Invisible boulders rumbled [illegible] they [illegible] and lost one another on the bottom.

The Lohit had also risen, carrying [illegible] great logs which had already begun to jam. The previous night we had watched the water in Rima's main irrigation channel, whence we drew our own supply, dwindle until it ceased to flow. For the next three weeks until we found a spring, drinking water was a serious problem.

In Rima itself every house had lost its roof, every outhouse had collapsed. Its little [illegible] with [illegible] flags heavily thatched [illegible] Cattle and [illegible] had been [illegible] [illegible] there was no [illegible] left.

[illegible] opened in the fields [illegible] banks had slipped, and here and there whole blocks of land had sunk several feet. Worse, the rope bridge across the Lohit River, connecting Rima with the outside world, had been swept downstream after breaking

### Mountain Giants Ripped to Pieces

The most startling changes were, of course, in the mountain landscape. Steep and craggy, with only thin pine forest for cover on the exposed face, almost every hillside had been torn open (pages 404-5). Strips of green pasture half a mile long had peeled off, leaving [illegible]

Nor was this damage confined to the outer

**An Earringed Mishmi Spearman Wears His Hair Long**

[illegible]

[illegible] A later view revealed [illegible] right back to the [illegible] piled to pieces and [illegible] again, and that millions of tons of rock had been hurled into the narrow valleys.

The [illegible], or fatalism, of the local [illegible] in the face of the catastrophe was [illegible]. Mending their [illegible] [illegible] in a [illegible] [illegible] a repetition of the [illegible] they must all be [illegible].

[illegible] The wind rose [illegible] and the [illegible] of the mountains became like shadows, and the red sun looked like a copper gong. I could almost believe it clanged as its [illegible] the western range.

The [illegible] swept by in a [illegible] hundreds of [illegible] in the water.

Night came again, an uneasy [illegible] marked by more severe tremors, each preceded by a roar like distant gunfire, or perhaps [illegible] since it seemed to come from the sky. So it continued night after night and day after day, the earth trembling as if frightened at the havoc it had wrought.

[illegible], avalanches of rocks rolled and rumbled down the mountainsides, and the dust cloud thickened and swirled. All [illegible] was coated with the finest gray powder. We [illegible] and breathed dust; it filled eyes, nose, and ears. When rain fell it was a shower of mud.

To our other worries was added the [illegible] feeling of being [illegible]. Hasty efforts to get a rope bridge across the river failed, and after three days the attempt was abandoned. We should have to wait till the river fell.

I turned over in my mind other routes out of the Lohit Valley, but could not hide from myself the fact that every alternative to the way we had come was long, difficult, and certainly dangerous. We could not cross the high passes, or even reach them, nor could we go down the Lohit to Sadiya on the Rima side of the river.

To attempt to go further up the valley, were that possible, was to get uncomfortably close to the Communists who were fighting over Tibet. In fact, any escape from our predicament was out of the question until we could cross the river.

We took careful stock of our position and prospects. It was impossible to reach the alpine meadows from Rima now. On short rations we had food for only about two months, nor could we buy more locally. We heard a rumor that a political officer, who [illegible] in Communist [illegible] had lately [illegible] the frontier with an armed escort [illegible] killed by the earthquake.

An Assam Rifles [illegible] on our side of the river on [illegible] the Burma frontier was [illegible] reported safe by runner - [illegible] Rima [illegible]. When at last we made contact with the [illegible] [illegible]

senger, we were able to send them [illegible]

[illegible] the sticky, hot days passed in slow procession. On the last day of August, more than a fortnight after the earthquake, the [illegible] lost patrol [illegible] into our camp, having [illegible] almost incredible difficulties. Their clothes were torn, their boots worn out. They had no food, and we [illegible] more than half of our [illegible] to them.

We ourselves were now reduced to a mere [illegible] of 12 days' supply of flour and rice; for weeks we had lived on little else. Something had to be done quickly.

### River Crossed on Bamboo Rope

At our urging the local people tried again to establish the rope bridge across the Lohit, and by September 2 they at last got a line across (page 415). By the 5th a newly planted bamboo rope was in position, and we decided to leave on the 7th. But first we sent off an urgent message south to Walong, an Indian outpost in Assam near the border of Tibet, calling for rations for the patrol and ourselves.

Porters for our journey arrived early on the morning of the 7th, as promised by Rama's headman, and the whole party set out for Walong. We crossed the river by the rope bridge safely. Each passenger was suspended by leather thongs from a half cylinder of hard wood which slid easily over the bamboo (page 415).

Earthquake damage beyond the river, though conspicuous, did not seriously impede us; in places [illegible] ground was so badly fissured as to be [illegible] up.

A Tibetan Lay Pag Suggests the Snowman's Spoorman

[illegible]

By evening we had reached a large village, and here we met a party of Assam Rifles who had been sent up from Walong [illegible] to comparative safety. [illegible] days' food for all, much to our relief, for we had enough left for only two days even on reduced rations. On the way the party had bridged torrents which, since the earthquake, had become ungovernable.

From this relief party we heard news of the [illegible] Walong [illegible] all [illegible]

First, [illegible] officer and [illegible] party were [illegible] had a miraculous escape from death. Three of their porters had been killed, [illegible] injured by falling rocks, and their camp burned with all equipment and food [illegible]

Second, we [illegible] for the first time of the terrific intensity and wide extent of the earthquake.

Third, we found that there was no prospect of planes dropping food for us at present, but there was enough rice stored at Walong to feed the entire party, including extra months, until November. This, however, allowed none for porters across the Mishmi Hills, who certainly could not carry loads unless they received rice.

Though we were strongly advised not to

**Assam Pavement Stages Water Gushes Up Through the Earth**

[illegible]

**This Rock Slide Buried Campers Alive**

[illegible]

attempt the difficult and hazardous journey to Walong, we determined to go through with it now that we were on our way.

On the following day we crossed a tributary of the Lohit at a place where we had camped for a month on the way up, half a year previously. We hardly recognized the place. For two days after the earthquake the river, dammed by an avalanche, had ceased to flow. When the dam broke, a flood swept down the narrow valley, ripped out its thick lining of forest, and plastered boulders to a depth of several feet with gray mud whose fetid smell fouled the air.

Now the water had fallen and the mud hardened; thus we had no great difficulty in crossing.

### Hair-raising Traverses on Goat Trail

From this point on the going grew steadily worse. Drinking water was scarce, and we had to make long stages to reach it. The goat track we were following climbed to dizzy heights above the river and crossed hair-raising traverses where the whole mountainside had slipped.

To the peril of falling over the edge of the precipice on one side was added the danger from falling stones on the other. Our fear of this danger was heightened by the rock falls we watched across the river. At one spot opposite our camp, where the cliffs rose almost sheer from the river for 2,000 feet, a fall occurred regularly every half-hour.

I have never watched a more terrifying sight. Immediately after the sharp crack of the rocks breaking loose came a crashing, grinding roar as they poured into the narrow chute, gaining speed. Then, toward the bottom, huge boulders leaped out to meet the river, spinning in the air as if fired from a gun, while the dust hung in clouds like smoke.

On the night of September 10 we camped near a hot spring after an exhausting day's march of eight and a half hours. Each morning we had started at daylight in order to get over some of the most dangerous places before sun and wind combined to start the boulders slipping and sliding. We were now only about a mile from Walong, but it was a mile of danger as stress. More than ever was it necessary to start early. We got up at 4 o'clock, packed hurriedly, and before 5 o'clock were on our way.

Thus, on September 11 the whole party now numbering (with riflemen, porters, and our own group) about 60 people, marched into Walong amidst the congratulations and handshakes of the garrison.

We settled down in camp at Walong with the knowledge that the path on to Sadiya had been overwhelmed in a score of places. Until some of the gaps had been patched up and some of the rivers bridged, there was no hope of getting straight through, and therefore no point in starting. We could expect at least another month of inactivity.

### Thundering Avalanches Continue

It was difficult to proceed more than a mile or two either up or down the valley under present conditions; tremors continued, and on both sides of the river rocks came thundering down. Sometimes in the dead of night we were awakened by the terrifying noise of a big rock avalanche at close quarters.

It was possible, however, to climb shattered spurs and gullies immediately above the outpost, though extreme caution was necessary. I went out on botanical reconnaissance nearly every day, on one occasion reaching 8,000 feet altitude. Several times, by rough tracks, I climbed to more than 6,000 feet, 2,000 feet above Walong at the bottom of the gorge.

Each evening we gathered in the political officer's hut, read the wireless telegraph messages which had come in, and discussed our prospects of escape. One fact emerged clearly: Because of the shortage of porters we should have to withdraw by detachments.

On October 2 the political officer's party started for Sadiya. We were sorry to lose them, especially the P. O., a Lushai and a gallant fellow as well as a most cheerful companion. But I was thankful that we ourselves were not leaving just yet; I still had a few days' grace in which to reach the alpine region and collect seeds.

After our companions left, I persuaded two of the local inhabitants to reconnoiter the one remaining possible route to the heights. They returned three days later with the news that it would "go." An injured shin prevented my wife from making the climb; so I went off with four porters carrying light loads.

After crossing cliffs of heartbreaking difficulty, we made a long, straightforward climb up a steep grass slope and finally camp[illegible] on the edge of a forest at 7,000 feet. Higher we could not camp for lack of water.

Here we spent three nights. Twice I climbed to nearly 11,000 feet, collecting seeds of temperate-forest trees and shrubs. Then the clear autumn weather broke, thick mist shrouded the mountains, and we returned to the valley.

Though the earthquake frustrated the major part of our alpine seed collecting, this brief expedition yielded valuable results to supplement our earlier work. We collected seed from about 50 species of plants. Of these, about half a dozen species turned out to be

A Pack Load Slides Across the Raging Indus on a Rope of Twisted Bamboo

[illegible]

[illegible] Nanga Parbat [illegible] Nanga Parbat [illegible] Nanga Parbat [illegible]

### River Bursts Earthquake-made Dam

[illegible] Our [illegible] Mountain [illegible] Nanga Parbat [illegible] However we [illegible]

[illegible] Nanga Parbat [illegible] Nanga Parbat [illegible] Nanga Parbat [illegible]

Slowly the [illegible] Nanga Parbat

ing we learned that the Yepak River, a tributary of the Lohit hidden in its near-by valley, had been blocked for 12 hours by an avalanche. The rock dam gave way in the evening, letting out the pent-up water, and it was this which had caused the thunder we hear. Once again we were delayed while another temporary bridge was thrown across the Yepak.

On October 16 we set out for Sadiya, hoping to reach the plains in 12 days. Little did we realize what was in store for us. The 10 days' journey across the Mishmi Hills is divided into three rugged sections of one four-day and two three-day marches. At the end of each section there is a small military outpost where we changed porters and could, if necessary, halt for a day's rest.

The first day's march, which included crossing the unleashed Yepak, was not as difficult as we expected, though when we halted that evening at the foot of a tremendous precipice I guessed we were in for trouble on the morrow.

### Route Climbs a Dizzy Cliff

On our journey into Tibet we had walked around this cliff, but now eight feet of swift, ragged water battered at its foot. Up the face of the cliff now climbed a narrow timber gallery suspended by loops of wire from iron pitons driven into the cracks. It sloped upward at an angle of some 30°, curling around the smooth buttress and disappearing from sight around a corner.

There was just room enough to inch along between the rock wall and a loose handrail, which was meant to give moral but no other form of support.

After we had turned the corner, the gallery ended abruptly, and we found ourselves on the brink of the cliff hundreds of feet above the white-capped river, with a dangerous traverse of several hundred yards across a smooth, steep slope.

This was bad enough, but what made it infinitely worse was the ever-present threat of a rock bombardment from above, or even of the whole track sliding into the river as a fresh stratum peeled off.

The slope began a thousand feet or more above our heads. All such slopes were dangerously unstable and still very active, though it was nine weeks since the earthquake. We had the uncomfortable feeling that the next avalanche might start at any moment.

It was impossible to run across crumbling faces of this sort; there was no path, nothing but a series of toe steps slanting upward or downward, often nearly obliterated, with nothing to hold on to. We leaned our weight against bamboo staffs, as on a snow traverse, keeping as upright as possible to press nearly vertically on the loose material. It was a matter of balance, and balance alone. Luckily my wife's nerves are not affected by height. The porters, carrying nearly their full 60-pound loads, crossed the most frightful slopes as steady as guardsmen.

### Rocks Hurled with Cannon Force

Late that afternoon we had to negotiate another hazardous traverse even worse than the first one. At one point stones were whizzing down, and we crouched against the rock as they sang over our heads. Their velocity may be gauged by the fact that we passed a pine tree in whose trunk several sharp-edged rocks hurled from the cliff above were deeply buried (page 407). So began our baptism of fire on this leg of the trip.

On the third evening we reached the corner where the Lohit makes a spectacular bend from almost due south to northwest. There a change of climate, and with it a corresponding change of forest, takes place. With greatly increased rainfall and a warmer winter, a type of broad-leafed Malayan jungle replaces the Tibetan pine forest.

I innocently supposed that once we exchanged the bare granite cliffs of the upper gorge for the deeply eroded slopes of the middle valley, with their protecting cloak of broad-leafed forest, there would be no more serious slides. I was quickly disillusioned. No sooner were we round the bend than we found ourselves on a particularly bad traverse, the smooth face sloping steeply for one or two hundred feet before dropping sheer to the river 1,000 feet below.

I consoled myself with the thought that we were scarcely into the real forest; probably the thick jungle of the lower valley would hold up the slopes. But in vain; landslides were perhaps fewer here, but they were even more sudden and violent.

That evening we completed the first section of four marches without accident and arrived at a satellite outpost of the Assam Rifles. It was the *Durga puja* festival, celebrating the end of the monsoon season, and in the evening we were invited by the *hawildar* (sergeant) to command to drink rum with him and listen to the gramophone. We got no news here, for the post had no wireless set.

During the march from Walong we had passed numbers of Mishmi porters carrying up cattle, potatoes, and kegs of rum. It was a relief to know that transport was starting to move along this tortured track once more.

We had to rest a day at the outpost while fresh Mishmi porters were engaged (page 410). Our Tibetan porters started back for Walong.

It began to rain, and when we set out again on the [illegible] it was still raining. The most formidable obstacles we had to cross on this leg of our journey were the steep [illegible] of the many sidlike [illegible] that are characteristic of [illegible] goods with high rainfall and soft schistose rock.

### Flooded River Blocks Escape Route

Nevertheless, we safely covered the four long stages to the next outpost, only to learn that the Tiding River ahead of us was in flood. We should not, we were told, be able to cross it for a week until another temporary bridge (the [illegible] had been put up. [illegible] we [illegible] the road [illegible] there was no but to [illegible] on [illegible] where we were [illegible] it continued to rain.

The outpost possessed a wireless set, but it had been out of order for some weeks. We did get a little stale news from an Assam paper that had come up by post a month before. It gave us our first [illegible] account of the earthquake and floods in the Assam valley. We heard too, that the political [illegible] had [illegible] the [illegible] [illegible]

Late we learned that the Lohit River itself had been blocked, an immense lake had formed, and there was talk of [illegible] the [illegible] of possible assistance. However, after 36 hours the dam burst. The flood that followed was [illegible]

[illegible] the Tiding River also had been blocked [illegible] that collected [illegible] Of course Sadiya was almost swept away. Finally, the Tiding, still the most formidable [illegible] between us and the plains, had [illegible] and subsided, leaving itself [illegible] manner.

It was still raining [illegible] With only five more marches to the motor road that leads into Sadiya, the week's [illegible] here was [illegible]

The slow hours passed, and on October 30 we resumed our journey in clearing weather. On November 1 we reached the Ill-famed Tiding and found a party of men busily constructing the temporary cable suspension [illegible] The [illegible] we saw [illegible] good. [illegible] [illegible] were being set up [illegible] for [illegible] the [illegible]

Next morning we found ourselves in what appeared to be a vast, stony desert. We were in the almost-dry bed of the great lake which the blocked river had formed.

To say that not one stone remained upon another of the godowns and the bungalow we had passed on our way up would give a totally false impression. There were millions of stones; but no one would have suspected

Sturdy Tibetans Carry a Bridge on Their Shoulders

[illegible]

**The Author's Injured Wife Crosses a Mountain Flood on a Porter's Back**

[illegible] difficult trails, but here she accepts a ride [illegible] Miami tribesmen pack 60-pound loads.

[illegible] work of [illegible] Dare. It was not destruction. It was complete annihilation.

[illegible] we reached a [illegible] village [illegible] the Lidar [illegible] the [illegible] Belgian Government expedition [illegible] we had seen yet. Whole ranges of hills [illegible] had swept over the [illegible].

[illegible] Mount [illegible] and there [illegible] the [illegible] of the [illegible]. It made up for all we had suffered.

[illegible] we crossed [illegible] Nature's [illegible] we [illegible] and [illegible] wrecked [illegible] Nature's [illegible] we [illegible] and [illegible]

[illegible] the [illegible] Belgian [illegible] and [illegible] the [illegible] Mount [illegible] the [illegible] Nature's [illegible] we [illegible] and

# New National Geographic Map Shows North America's Altered Face

TEN busy and eventful years of heavy production for war and peace, of growth and aerial exploration, have etched their effects upon the familiar face of North America.

Reflecting this decade of development, the National Geographic Society's new map of North America, sent to members as a supplement to this issue, gives an up-to-date full-color, full-length portrait of our ocean-moated continent.

Thousands of additions and changes have been made since The Society last mapped this area early in 1942, just a few months after the attack on Pearl Harbor plunged the United States into all-out war.

### How Current Events Change a Map

Events which remake maps need not be so earth-shattering as a war, the sudden birth of a volcano, or even a new United States census, though all of these things have made their marks on the surface of North America in the last ten years. Changes may come from such varied causes as these:

A little-known officer in the United States Army rises to world fame as commander of the Allied invasion of Europe—and a peak in Alberta becomes Mt. Eisenhower.

In honor of a popular radio program, a town in New Mexico changes its name from Hot Springs to Truth or Consequences.

A Canadian prospector, looking for new claims to stake, pores late over some new aerial photographs of northern Canada—and the world's largest meteoritic scar, Chubb Crater, goes on the map.*

Thanks to oceans and to efforts of America's millions, no earth-scorching invasion armies marched across this favored continent. No war-born treaties, no land grabs, no revolutions or intrigues twisted its international boundary lines. But atomic development spawned new cities as far apart as Tennessee and New Mexico, Nevada and the State of Washington.

### All Inhabited Continents Newly Mapped

With this map The Society's world-wide membership now has a complete postwar atlas of the world's inhabited continents. Similar large ten-color maps of Australia, Europe, Africa, South America, and Asia have been painstakingly prepared by The Society's cartographers and issued as supplements to The Magazine in the last four years.†

More than two million copies of the new North America map have slid from big lithographic color presses to meet the needs of The Society's ever-growing family of members.

On a scale of 173.6 miles to the inch, the 28-by-35-inch sheet shows not only the whole of North America but also the northern part of South America, including major portions of Colombia and Venezuela, rich in oil and iron. It contains a total of 5,204 place names.

The use of a larger scale (1 to 11,000,000 in the new map compared to 1 to 12,000,000 in the old) gives a 19-percent increase in area and permits the inclusion of 1,266 more place names than its predecessor had.

Like red arteries and dark veins, main railroads and highways crisscross the map. Important airports speckle much of its surface with red stars.

Changes in the appearance of the new map reflect, in part, improved techniques in map making. A new method of depicting a curved portion of the earth's surface on a flat sheet of paper, the Chamberlin Trimetric projection, invented by Wellman Chamberlin of The Society's Cartographic Staff, is here used for the first time on a North America map. It is particularly well suited for portraying a generally triangular continent like North America with a minimum of distortion.

### Inset Shows How Close Is U. S. S. R.

How far is Russia from United States soil? A large inset of the Aleutian Islands and the Bering Sea emphasizes the answer: a mere three miles. Eskimos living on the two Diomede Islands used to visit relatives and friends, sledging over the ice from one hemisphere to another and from one date to another without a thought of world time or world tensions. Now the Kremlin has clamped down on this international visiting.

Dotting the frozen fringes of the Arctic Ocean in Alaska, Canada, and Greenland are a number of new communities which *cannot* be shown, because of military security.

These are the new United States and Canadian military and airforce bases, set up to listen for and repel any sudden air attack on this continent across the Arctic route. The number, size, names, and locations of these year-round "villages" are all secret.

Out of this Canadian-U. S. teamwork has

* See "Solving the Riddle of Chubb Crater" by V. Ben Meen, NATIONAL GEOGRAPHIC MAGAZINE, January, 1952.

† Members may obtain additional copies of the new North America map (and of all standard maps published by The Society) by writing to the National Geographic Society, Washington 6, D. C. Prices in United States and Possessions, 50¢ each on paper; $1 on fabric; Three, 75¢. Elsewhere 75¢ on paper, $1.25 on fabric; Index, 50¢. All remittances payable in U. S. funds. Postpaid.

come a virtual remapping of the American Arctic coastline. Foxe Basin, for example, formerly a blank expanse of icy water, boasts a handful of air-discovered islands. One, more than twice as large as Long Island, New York, honors the baby Prince Charles who may someday mount Britain's throne.

Northeast of Hudson Bay, like a round pockmark on the nose of Quebec, a newly drawn circle marks meteoritic Chubb Crater, so called for the prospector who hoped to find diamonds there. More recently, the Canadian Board on Geographic Names has formally retitled it Ungava Crater (Ungava is an Eskimo word meaning "far away"). The shorter name is now so well known that The Society's map lists both names.

### Rails Push Toward Labrador's Iron

Stimulated in part by the needs of defense, North American steel mills last year poured approximately 109,000,000 tons of steel, about half of the world's total production. More than 105,000,000 tons of this were produced by the United States. At the same time, the main U. S. source of iron ore, Minnesota's great Mesabi Range around Hibbing, has grown dangerously close to exhaustion.

Wherever important new iron deposits have been found, new communities are springing up and old ones booming. One of them is Burnt Creek, Quebec, which will be the mining and shipping center for vast new-found deposits of iron extending into Labrador. A thin dashed line connects it with Sept Iles (Seven Islands), on the St. Lawrence River.

Where this line runs, crews of men and heavy machinery are now working to carve a new railroad out of the wilderness—a railroad which will eventually make Ungava considerably less "far away."

Another booming beneficiary of the world's eternal need for more steel is Iron Mountain, Utah, where new exploration has recently doubled estimates of iron reserves. Far south in Venezuela, the names of Cerro Bolivar and El Pao have appeared on the map, marking huge new-found deposits of high-grade ore.

### The A-Bomb Jars Geography

Because of atomic research or atomic energy's raw material, uranium, new communities have sprung up and old ones have become newly famous. Names like Los Alamos, New Mexico; Oak Ridge, Tennessee; and Frenchman Flat, Nevada, win inclusion in this map of North America.

Before World War II, total world demand for uranium ore amounted to only about 230 tons a year; its chief use was as a coloring agent in glassware and ceramics. Now, with the Atomic Energy Commission buying every pound available, uranium finds itself in a class with the precious metals.

Almost all U. S. uranium production comes from the Colorado Plateau area where Arizona, Colorado, New Mexico, and Utah meet. Here newly important communities—and new names on the map—are cropping up fast. Naturita, Durango, and Rifle, all in Colorado; Monticello, Hite, and Marysvale, in Utah; and Grants, New Mexico, are on the new map chiefly because they are centers of uranium production or processing.

The Canadian Government has bought the El Dorado mine on Great Bear Lake in the Northwest Territories, and also has found uranium as far south as Lake Athabasca and Beaverlodge Lake, both in northern Saskatchewan. Canada yields much of our uranium.

During the winter of 1947–48 an alert young Canadian mining engineer, Robert Campbell, found a geological report which had been gathering dust in a Toronto library for a century. Written in 1847 by the American scientist John L. LeConte, it described a mineral found on the eastern shore of Lake Superior. LeConte called it "coracite."

Further research convinced Campbell that "coracite" actually was pitchblende, the primary ore of uranium. Armed with a Geiger counter, he set out to rediscover it. His strike marked the first pitchblende discoveries in the southern part of the Great Canadian Shield and spurred another uranium hunt in Ontario and northern Michigan.

### Map Reflects Alberta Oil Boom

In Alberta, Canada, vast petroleum discoveries made since 1947 promise to change the whole picture of North America's oil production. In one small area being worked at Edmonton, reserves are placed at a billion barrels of oil and more than five trillion feet of natural gas. The new field has added the name of Redwater, Alberta, to the map, and the future is sure to add more in this area.

The sedimentary basin on which this field draws extends over 500,000 square miles through western and northwestern Canada. A new 1,127-mile Inter-provincial Pipe Line can carry 95,000 barrels of oil a day from Edmonton eastward to Saskatchewan, Manitoba, and Great Lakes ports.

Of scientific rather than economic interest is a new place name in west-central Alaska—Curlew Lake. Dr. Arthur A. Allen bestowed it to signalize the end of ornithology's 165-year search for the breeding ground of the bristle-thighed curlew, the last of 815 North American birds to yield the secret of its nesting place and summer home.*

* See "The Curlew's Secret," by Arthur A. Allen, National Geographic Magazine, December, 1948.

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[illegible]

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General Motors Corporation

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Formerly Chairman of the Board
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U. S. Navy, Retired; President
Air Transport Association

THOMAS W. McKNEW
Secretary, National Geographic Society


ORGANIZED FOR "THE INCREASE AND DIFFUSION OF GEOGRAPHIC KNOWLEDGE"

[illegible] the purpose for which it was formed in [illegible] The National Geographic Society publishes the National Geographic Magazine monthly. All receipts are invested in The Magazine itself or expended directly to promote [illegible]

Articles and photographs are desired. For material The [illegible]

In addition to the editorial and photographic surveys constantly being made, the Society has sponsored more than 100 scientific expeditions, some of which required years of field work to accomplish their objectives.

The Society's [illegible] expeditions have pushed back the historic boundaries of the southwestern United States to a period [illegible]

By dating the ruins of the vast [illegible] command also [illegible] Indian [illegible] the past two hundred years.

In Mexico the Society and the Smithsonian Institution, January 17, 1933, discovered the [illegible] work of man in the Western Hemisphere, which we have a date. The site of stone in [illegible] Yucatan [illegible] Southern Civilization [illegible] antedates by [illegible] years anything heretofore noted in America and reveals a great center of early American culture previously unknown.

On November 10, 1935, in a flight sponsored jointly by the National Geographic Society and the U. S. Army Air Corps, the world's largest balloon, Explorer II, ascended to the world's [illegible] record, with Albert W. Stevens and [illegible] Anderson took about 10 pounds of [illegible] at the [illegible] Sun.

A notable undertaking in the history of astronomy was turned over to the Society to complete with the Palomar Observatory of the Carnegie Institute of Washington. The project will require four years to photograph the sky [illegible] and will provide the first sky atlas for observatories all over the world.

In 1937 the Society sent out seven expeditions to study the eclipse of the sun along a [illegible] path from [illegible] to [illegible] Venezuela. The fruitful results helped [illegible] geodetic surveys of South America and Asia.

The Society [illegible] $[illegible] and [illegible] on $75,000 was contributed by [illegible] to help preserve for the American people the finest of the giant sequoia trees in the Grant Grove of Sequoia National Park of California.

One of the world's largest kaolin and glacial systems outside the polar regions was discovered in Alaska and Yukon by Bradford Washburn while exploring for the Society and the Harvard Institute of Radiocosmic Research.


[illegible]

# IT'S A "CADILLAC" AMONG CADILLACS

THE GOLDEN ANNIVERSARY

Cadillac

YOUR CADILLAC DEALER

# FIRST IN TELEVISION

[illegible]

**WORLD'S FIRST HOME TV SET DEVELOPED BY G.E. 25 YEARS AGO**

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*You can put your confidence in...*

**GENERAL ELECTRIC**

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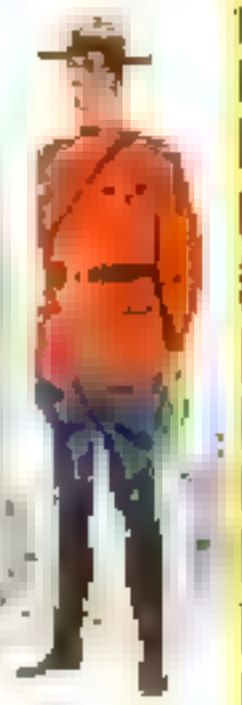
# Canada

## Vacations Unlimited!

Put dull care behind you up north in friendly Canada. Get away to lake-strewn woodlands, great National Parks, romantic seacoasts, towering mountains. Motor, ride, ramble, go fishing. Visit with relatives or friends; meet new people. Ask your travel or transportation agent; mail the coupon today.

**SO BIG...SO BEAUTIFUL...SO NEAR!**



CANADIAN GOVERNMENT TRAVEL BUREAU

Name _____

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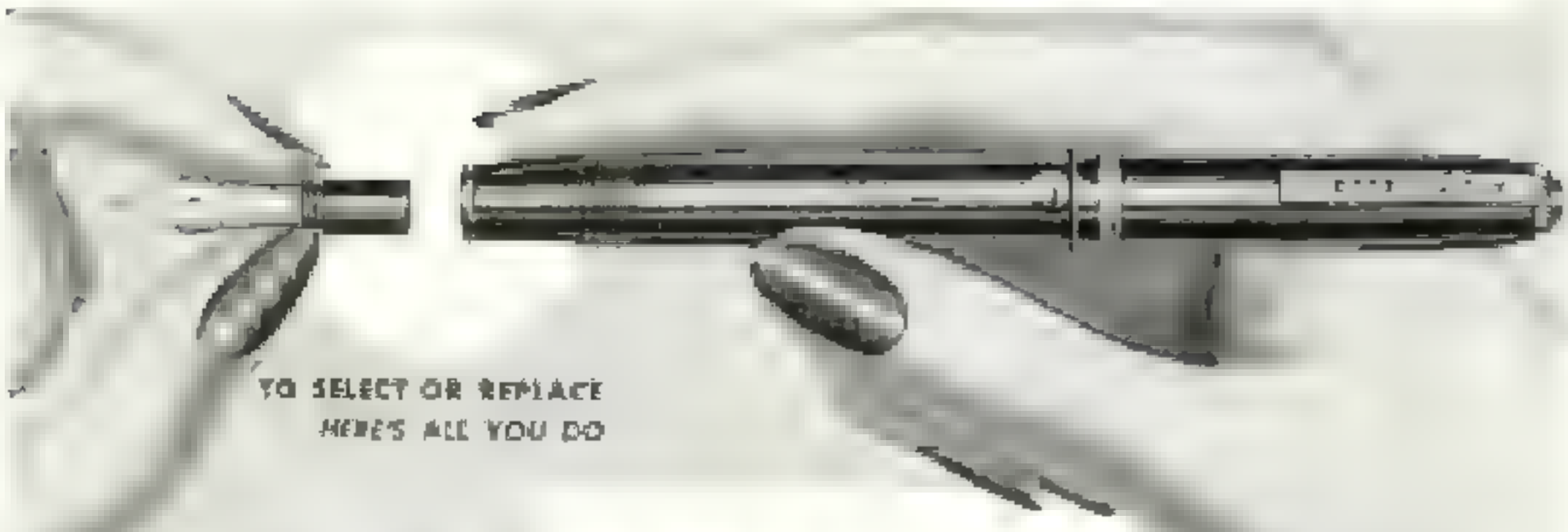
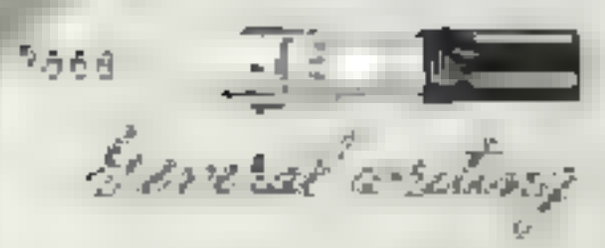
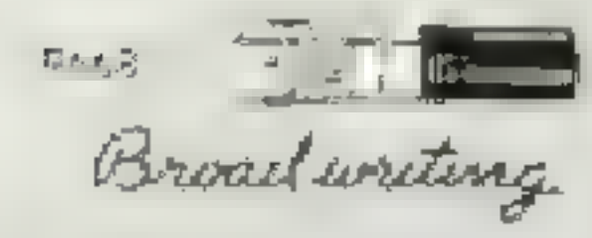
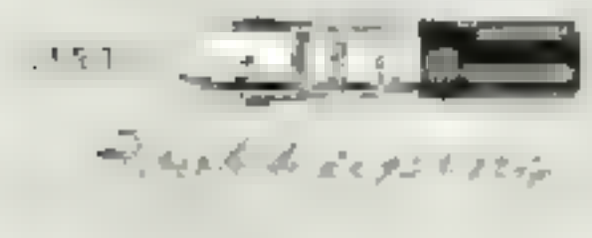
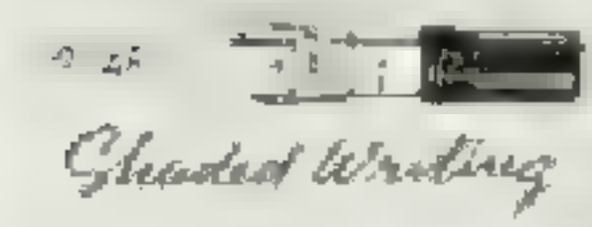
City _____ State _____

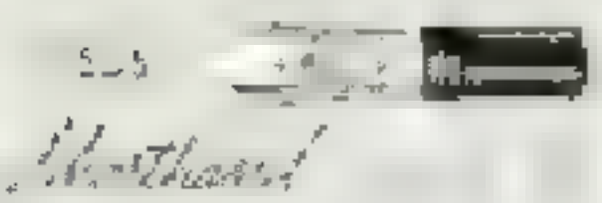


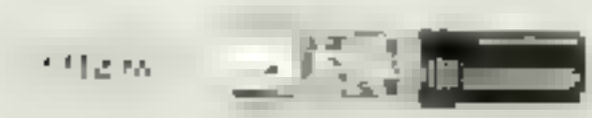





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All Esterbrook Points are *instantly* replaceable at any pen counter in case of damage.

*Model 444 Desk Pen Set* [illegible] *10 times more* [illegible]
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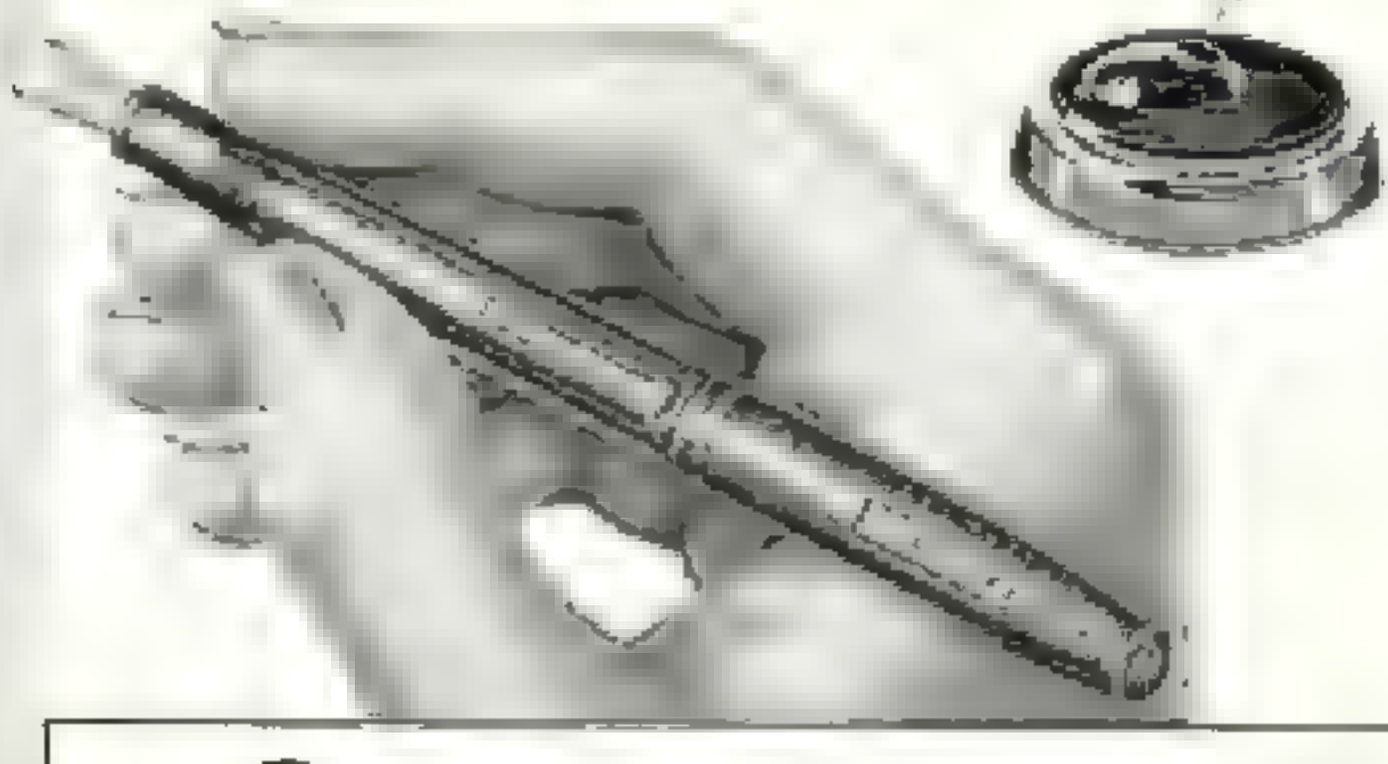

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NEW 21"
Admiral
TV HOME THEATRE
IN A CABINET
ONLY 28" WIDE!
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that stops annoying reflections. It's another Admiral first!

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Vacation fun unlimited! Dude ranches nestled in the Montana Rockies! Yellowstone—nature's three ring circus! Then the mountain and marine wonders of Washington. Island-dotted Puget Sound! Pacific Ocean beaches! Glorious Mt. Rainier and the Olympic Peninsula!

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Name

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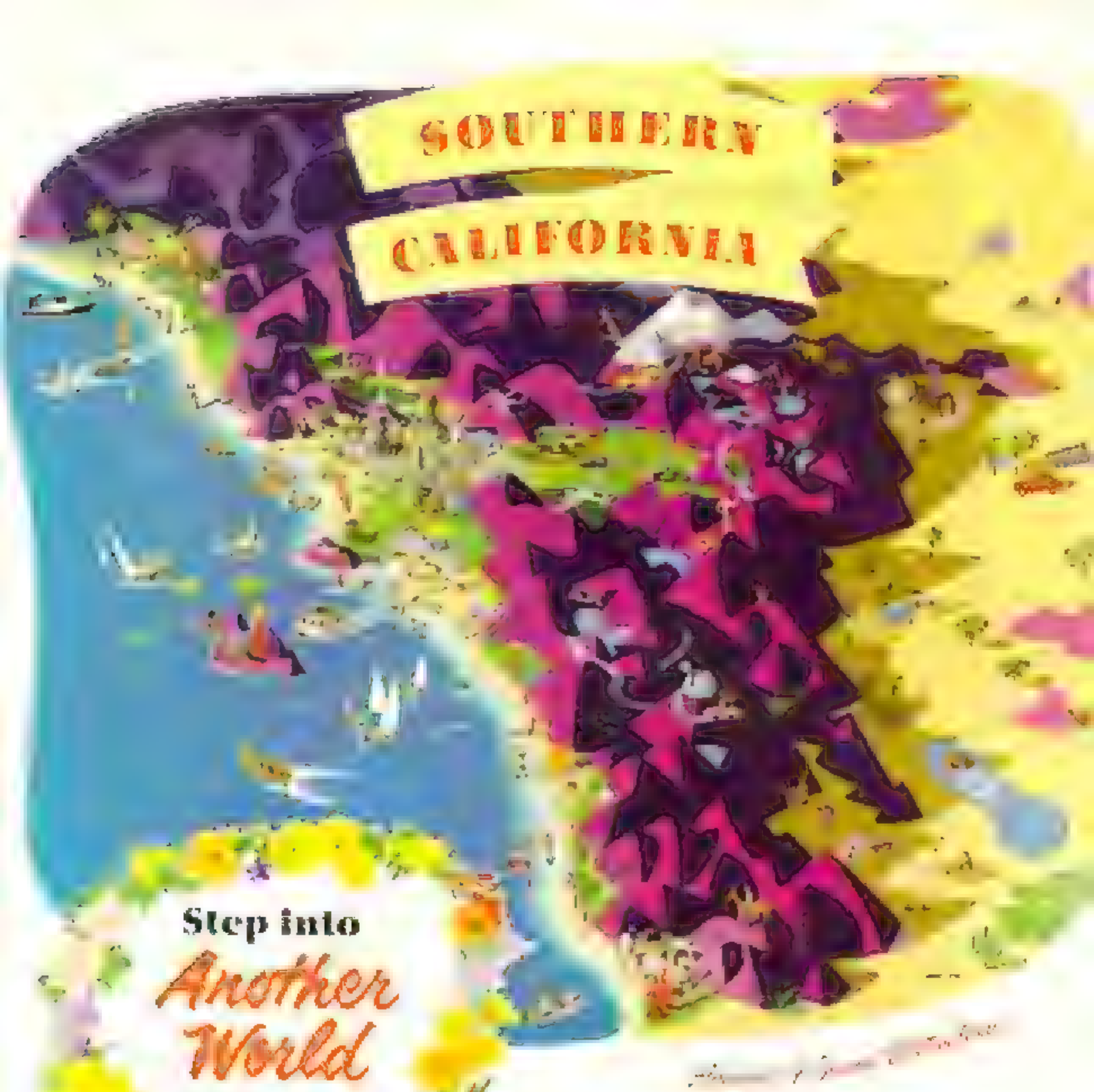
OUT IN FRONT

THE MILWAUKEE ROAD

Mention National Geographic.—It identifies you.




# Step into *Another World* this Vacation!

**This year,** make a *complete* vacation. One that will give you the *lift* that comes from leaving familiar surroundings and stepping into the exciting unexplored world of Southern California. Here, you can . . .

**RELAX IN THE SUN** [illegible]

**CAPTURE THE ROMANCE** of [illegible] desert palms. Spend a [illegible]

**SEE MOVIELAND** [illegible]

**EXPLORE THE DESERT** [illegible]

## Don't Wait—Come This Year!

Too often we put off life's most thrilling experiences, and for some reason, it's too late. So plan now to see and enjoy this colorful new world. Ample accommodations [illegible]

**FREE—a special travel folder** on Los Angeles County and all Southern California. Just mail this coupon today! [illegible]

TRAVEL **CANADA'S SCENIC ROUTE** TO EITHER COAST

CANADIAN NATIONAL RAILWAYS

*ONE OF CANADA'S 10 TOP MAPLE LEAF VACATIONS*

[illegible]

Across Canada [illegible]

[illegible]

Alaska Cruise [illegible]

[illegible]

British Columbia [illegible]

[illegible]

Eastern Canada and Lower Lakes —

[illegible]

Hudson Bay [illegible]

[illegible] Old Quebec and Modern

Muskoka Lakes of the Woods [illegible]

Ontario Highlands [illegible]

Provinces by the Sea [illegible]

Romantic French Canada [illegible]

**BOUND FOR A GAY HOLIDAY** in France? A business conference in a Continental capital? Make your trip a challenging experience [illegible] no extra cost. Relax in the extra [illegible] AIR FRANCE Continental [illegible] Enjoy the extra comfort [illegible] Friendly English speaking stewards [illegible]

# Go AIR FRANCE...

## Enjoy these "extras" in LUXURY and GRACIOUS LIVING ...the ULTIMATE in air travel... at NO extra cost!

**PIONEERS IN GLOBAL AIR TRAVEL:** 33 [illegible] experience in international [illegible] air [illegible] Veteran [illegible] AIR FRANCE's worldwide [illegible] travelers know and [illegible] the AIR FRANCE reputation for regularity, [illegible]

**WORLD'S FINEST AIR CUISINE:** Famous French food [illegible] AIR FRANCE [illegible] liqueur. The ultimate in [illegible] tradition

**AIR FRANCE**

THE LUXURY WORLD-WIDE AIRLINE

**"THE PARISIAN"**

[illegible]

**"THE PARISIAN SPECIAL"**

The world's famous ultra de luxe AIR FRANCE [illegible]

THE WORLD'S LARGEST NETWORK of AIR ROUTES Serving 70 Countries on 6 Continents

PARIS

[illegible]

LONDON

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ROME

[illegible]

SEE YOUR TRAVEL AGENT

[illegible]

# *I hated to tell her—*

## what a fool I'd been...

*(based on Hartford Fire Insurance Co. ad)*

At current values, my house was worth $30,000. My household effects, $17,000. So what did I do? Me a building contractor, who ought to know how inflation has increased replacement costs. On my own house, I just played ostrich . . . never gave rising prices a tumble . . . left the structure insured for only $12,000, its contents for $1,500. Came that dismal dawn, that disastrous fire, and my loss hit $23,726.56. I had "slept away" more than $7,200 of my family's money. And, believe me, I hated to tell *her* what a fool I'd been . . .

Don't "sleep away" any of your hard earned money.

Find out the *actual* value of your house at today's inflated prices. Your home's insurance and personal effects, too!

Then call in your Hartford agent or insurance broker, or write us for Hartford's free "Inventory Booklet." In over 5600 communities, you can locate your Hartford Fire Insurance agent by calling Western Union by number and asking for "Operator 25."

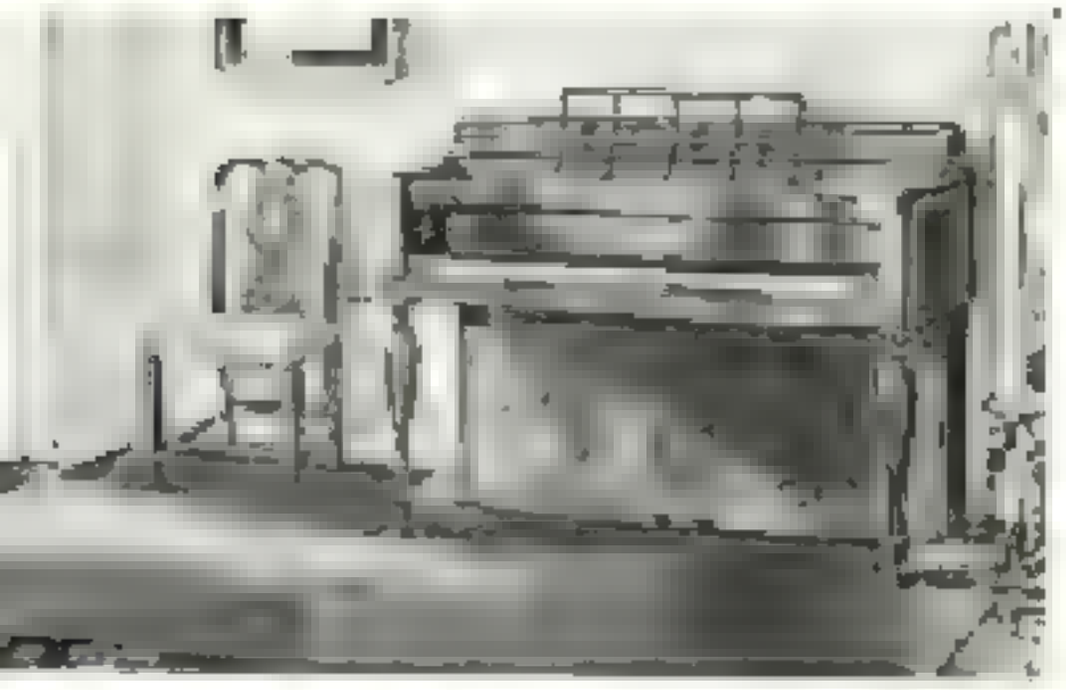
***Year in and year out you'll do well with the***

# Hartford

**Hartford Fire Insurance Company • Hartford Accident and Indemnity Company**
**Hartford Live Stock Insurance Company • *Hartford 15, Connecticut***

Reprinted by National Geographic [illegible]

## For your home: the piano chosen by the world's great artists



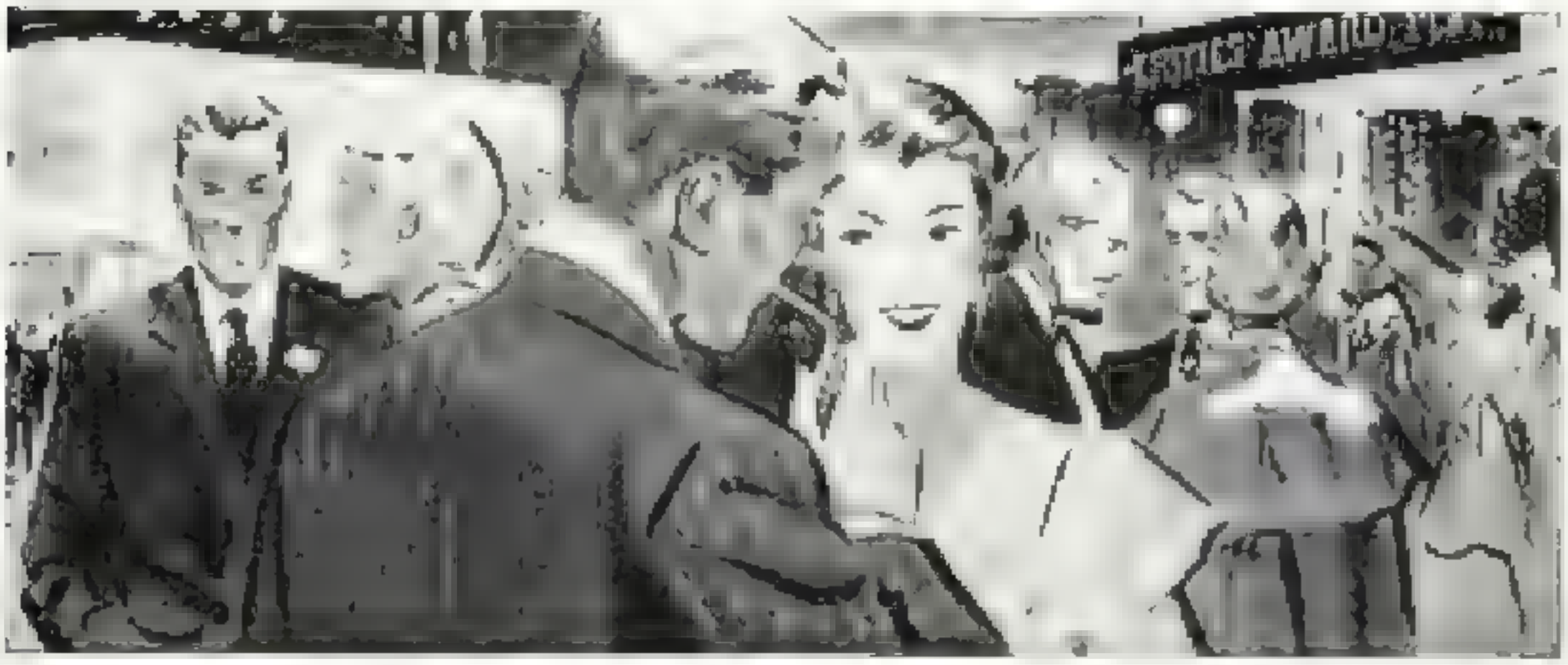
[illegible]

**STEINWAY**

THE INSTRUMENT OF THE IMMORTALS

# New York Vacation "Chit-Chat"

## ...with fun as the CENTRAL idea!



**I love that magic moment between the acts** . . . [illegible] about the play. My, was I glad, that first night, we'd come New York Central, arriving rested and ready for a Big Town big time! Then [illegible] Grand Central [illegible] to the top [illegible] Fifth Avenue shops [illegible] Wednesday [illegible]!

**New York has so many nearby sea-and-sun spots** . . . [illegible] sun and [illegible] sides to [illegible] see! We were thankful our New York Central [illegible] suggested reserving a Drive-Up Self car for us. That's really [illegible] relaxation . . . [illegible] get there by train on the restful scenic *Water Level Route*. Then get around [illegible]

**FREE!** 1952 Year-Round Travel Guide to New York and other exciting vacation lands. Send coupon to New York Central, [illegible] N3, 466 Lexington Ave., New York [illegible] N. Y.

Please send me FREE Year-Round Travel Guide

Name _____

Address _____

City _____ State _____

# New York Central

**The Water Level Route—You Can Sleep**

# U.S. PRODUCTION DRIVE TURNS SPOTLIGHT ON TRAINED MEN

**Chrysler Corporation's program helps people build better products and better careers for themselves**

George Heyer, noted magazine photographer, turns his camera for this picture to a program of support to American production. Here people learn to build military vehicles, defense weapons, and the cars and trucks that play a vital part in American life.

Heyer's pictures were made in Chrysler Corporation factories, classrooms and training shops. He shows a few of the thousands of men and women now taking part in Chrysler's widespread training and technical education program.

**TOMORROW'S CRAFTSMAN.** Heyer caught Robert Chase, son of a Chrysler Corporation employee, during one of his best lessons in how to use tools and make useful things. In special workshops set aside by Chrysler, Robert and other boys work in wood, leather and metal, as they get a glimpse of Chrysler careers. They take learning from a "library of tools" and more projects at home.

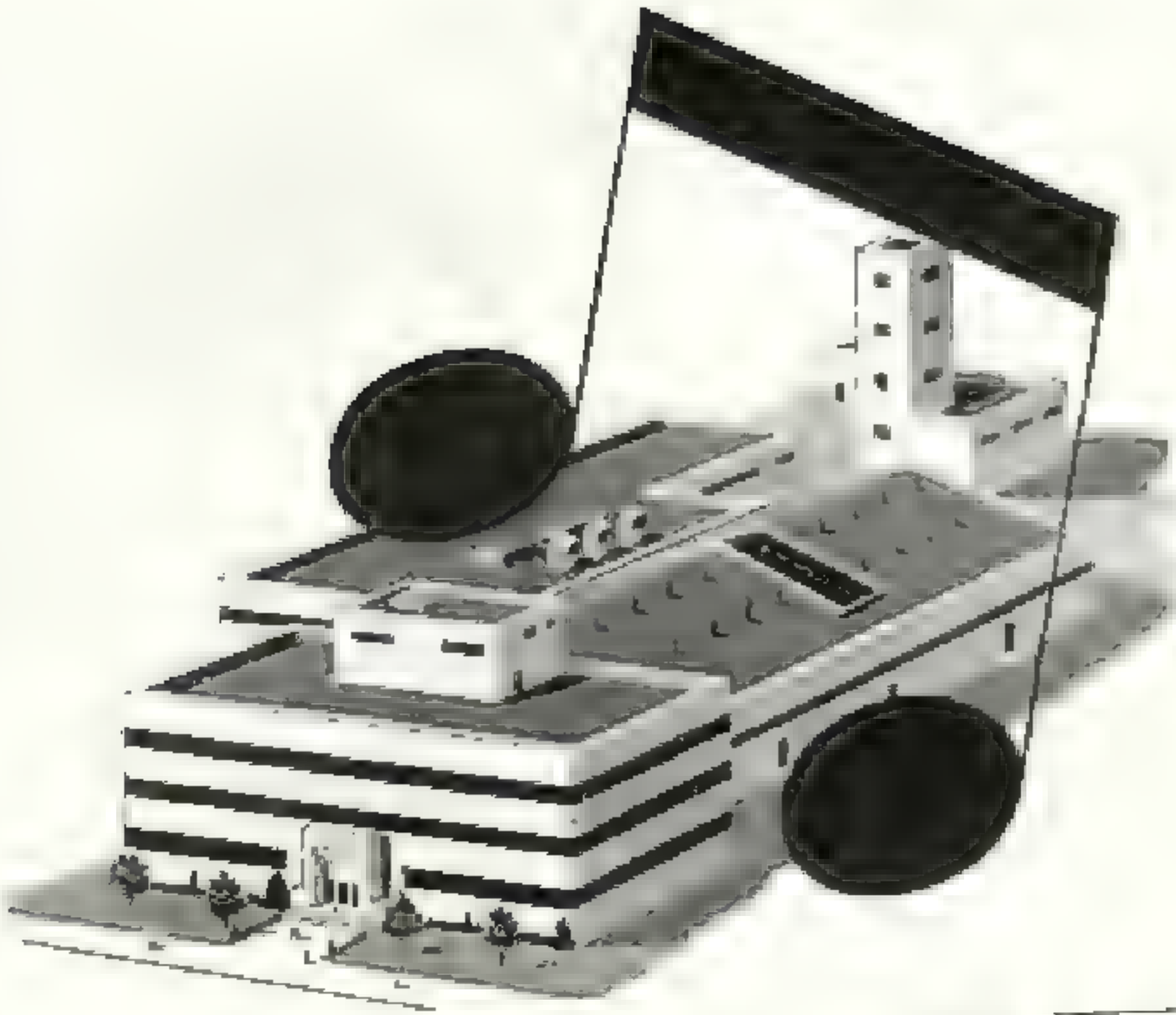
**"A GOOD MACHINE DESERVES A GOOD MAN, SON."** Heyer pictures Albert Baum learning about principles from veteran machinist [illegible]. For the past year Albert has been an Apprentice Trainee in Chrysler's Industrial Education program, learning the [illegible] of good pay. Chrysler helps graduates employed [illegible] to better jobs. For [illegible] and college students, there are jobs for graduates [illegible] both [illegible] and part time [illegible] such [illegible].

**THEY THINK IN CLAY.** In this [illegible] at Chrysler Institute of Engineering, employees [illegible] M. [illegible] and Fred [illegible] 27 [illegible] with [illegible] Chrysler [illegible] Institute [illegible] Chrysler [illegible] employed [illegible] Institute [illegible] Americans [illegible] production [illegible].

# CHRYSLER CORPORATION

**engineers and builds PLYMOUTH, DODGE, DE SOTO, CHRYSLER CARS & DODGE TRUCKS**

**Chrysler** Marine & Industrial Engines • **Gilbe** Powdered Metal Products • **Mopar** Parts & Accessories
**Airtemp** Heating, Cooling, Refrigeration • **Government** [illegible]



## Yes!...it is true what they say about Dixie!

THEY'RE not "tall tales"—the amazing things you hear about the Southland these days. Big things are happening down Dixie way.

Southern industry is on the march. Industrial development in the South is at an all-time peak.

Today the "song of the South" is the enthusiastic chatter of riveting guns as new factories go up. It's the steady hum of countless machines turning out manufactured products of all kinds.

This is the music of modern Dixie. Come down and listen to it. Come down and see!

*"Look Ahead — Look South!"*

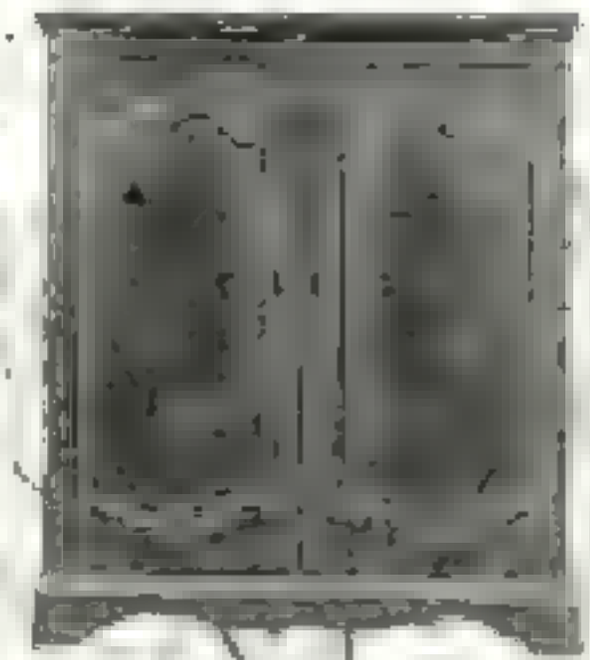
Harry A. DeButts
President

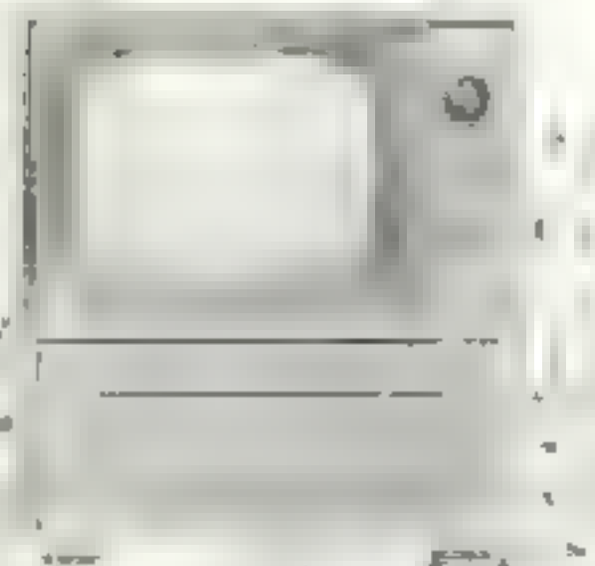
LOOK SOUTH LOOK AHEAD

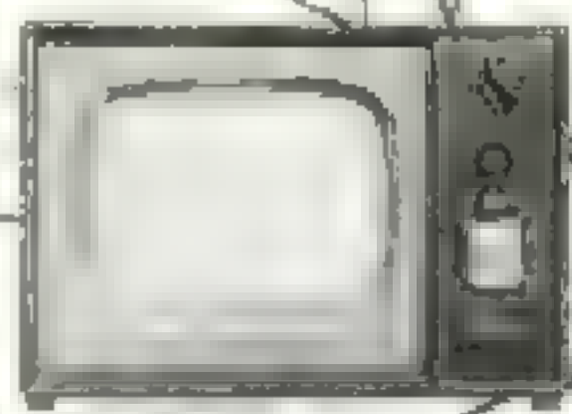
**SOUTHERN**
**RAILWAY SYSTEM**
WASHINGTON, D. C.

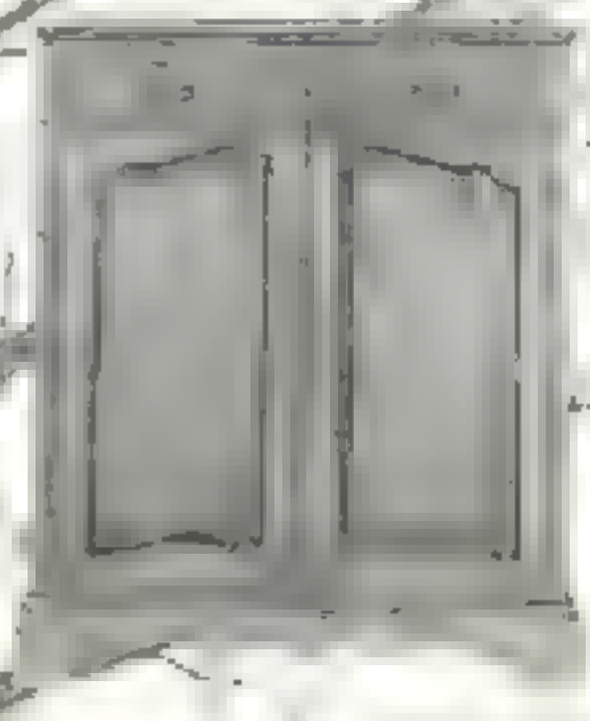
*The Southern Serves the South*

Meet me in the National Geographic—It takes you









**THE DANDIES**

Sound recording on the Du Mont record player. In four wood finishes.

**A DISTINGUISHED NEW LINE OF 1952 TELESETS**

*Heart of Heavyweight by*

# Du Mont

**EXPECT TO BE ENVIED**

That's part of owning these wonderful new Du Monts. Here are sound and pictures thrilling for [illegible] and clarity. Here are the greatest advances, the highest standards in television. Here, as you would expect from Du Mont, is [illegible] in electronics encased in the elegance of bench-crafted cabinetry.

*See the complete new Heavyweight line at your local Du Mont dealer.*

**DU MONT**

Allen B. Du Mont Laboratories, Inc., Television Receiver Division, East Paterson, N. J. and the Du Mont Broadcasting Network, 5 Middlesex Ave., N. Y. 22, N. Y.

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200 NOTE SHEETS (5½ x 7½ in.), 100 MATCHED ENVELOPES, [illegible] $1.00 [illegible]

**ENVELOPE PACKAGE**

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**DELUXE PACKAGE**

[illegible] $2.00 [illegible]

Someone you know would treasure a gift of American Stationery. It is the gift you can give any time — the occasion is yours. [illegible]

It is the gift you can use with pride. Its size and weight are correct. Its paper is smooth, [illegible] and lasting — in each package.

American Stationery is a value well worth equal. Note the [illegible] Notice it has been used by American business houses for years!

[illegible]

THE AMERICAN STATIONERY COMPANY
[illegible] PARK AVENUE, PERU, INDIANA

**THE FINE STATIONERY IN THE PLAIN BOX**

**SEE MORE...DO MORE...**

# have much more fun!

**For pleasure or business,**

***enjoy these many***

**HERTZ SERVICE advantages**

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*drive it as your own*

**RENT FROM HERTZ AS EASY AS A B C** . . . **A.** Come to a Hertz station. **B.** Show your driver's license and identify yourself. **C.** Step into the car and go!

**PRIVATE CAR PLEASURE** . . . You drive a new Chevrolet or other fine car in splendid condition and as private as your own. Rent any hour, anytime, for an hour, day, week or as long as you wish.

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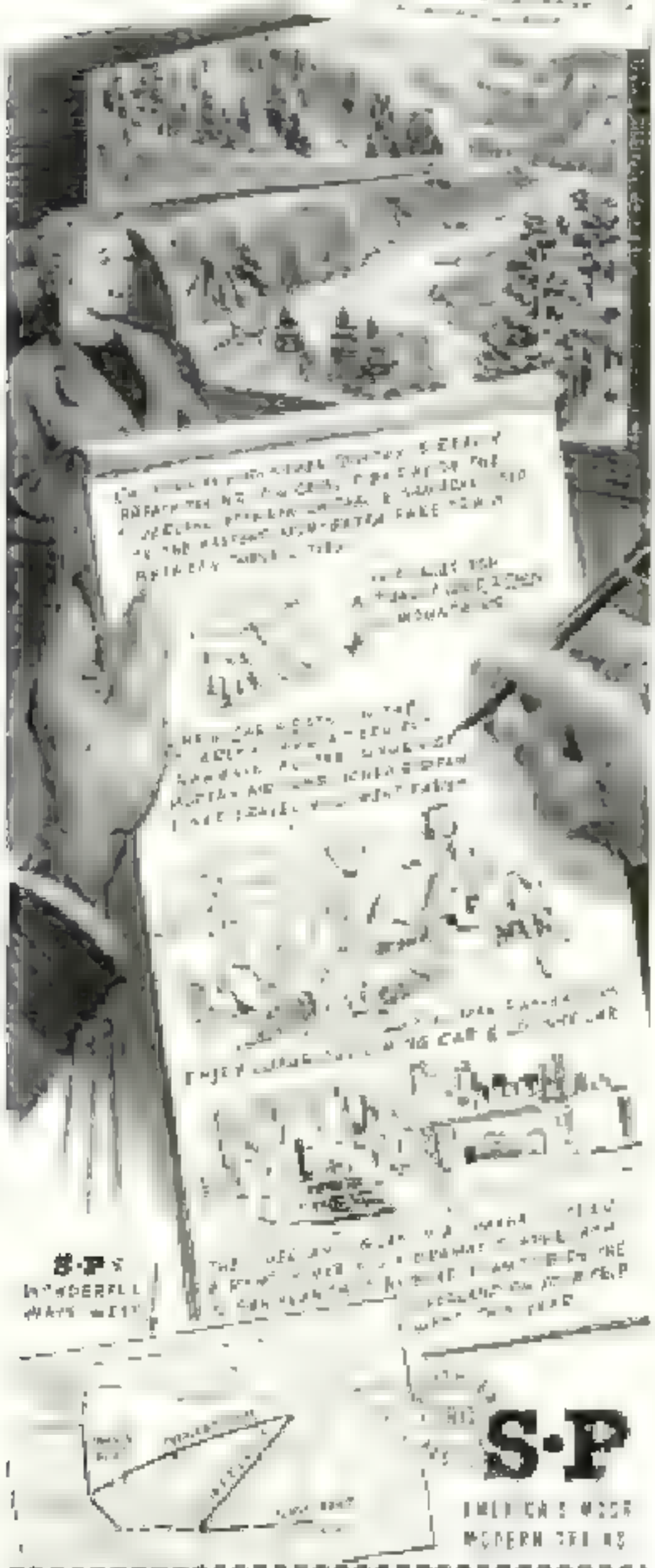
**FOR ADDITIONAL INFORMATION** . . . Call your local Hertz station, or write Hertz Drive-Ur-Self System, Inc., Dept. 832, 218 South Wabash Avenue, Chicago 4, Illinois.

Look in your telephone directory under "H" for your local Hertz station

WHEREVER YOU GO . . . WHATEVER YOU DO . . .
YOU CAN RENT A NEW CAR FROM HERTZ AS EASY AS A B C **HERTZ** *Drive-Ur-Self* **SYSTEM**

# I've been to California

on the "San Francisco Overland"

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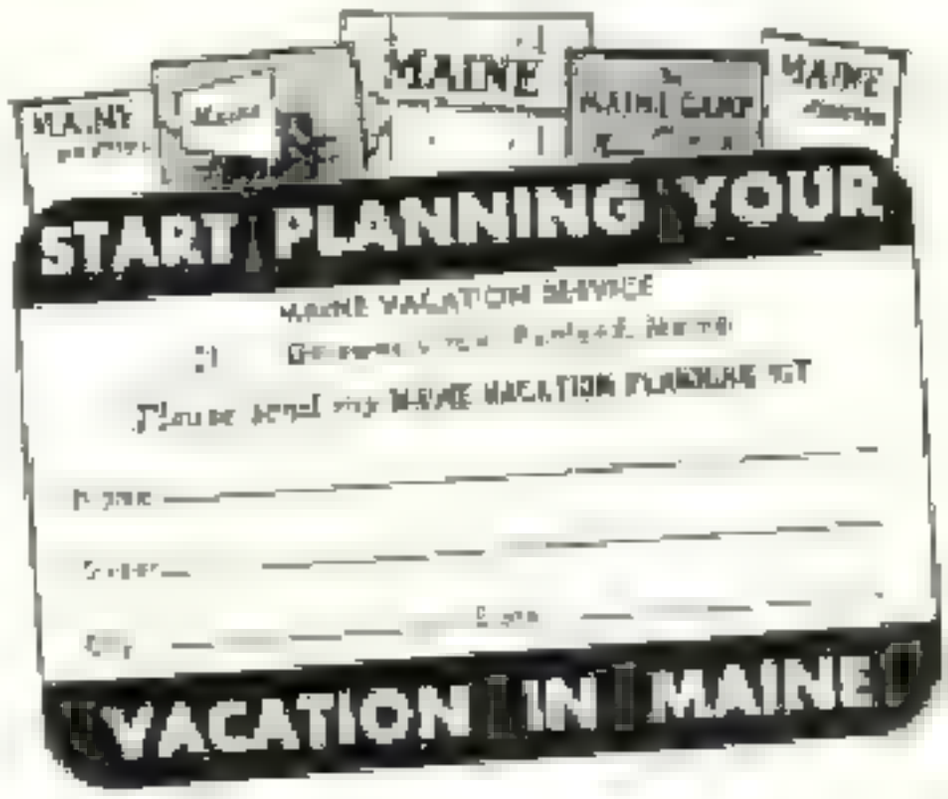
There's a new outlook on life in your Maine vacation! From forest to sea there's more in Maine to do . . . surf bathing, sailing, deep sea fishing, canoeing, camping . . . to see . . . historic landmarks, sailing regattas, horse racing, fishing competitions, spectacular scenery . . . and to enjoy . . . country fairs, art exhibits, summer theatre, golf tournaments, lobster festivals.

Send the coupon right away for where-to-go, what-to-do and what-to-see . . . in Maine . . . June through September.




Maine Development Commission

Dad
Mom
Sis
Bud
I HAD A WONDERFUL TIME
IN Washington State
WASHINGTON STATE AD
It's COOL, It's GREEN, It's GREAT!

# BOLEX® for bear bison and babies

Dr. Andras Lazlo of Southport, Connecticut, is a well-known medico, sportsman, explorer, lecturer and big game hunter. Having bagged many record specimens for leading American museums with his rifle, he now finds greater satisfaction in stalking big game with his Bolex (mounted on a gun stock of his own design) and Kern-Paillard® tele lenses. He is an active member of the Explorers' Club—he's just returned from coldest Alaska, with new Bolex movies of Bears, Bison and Bush Pilots.

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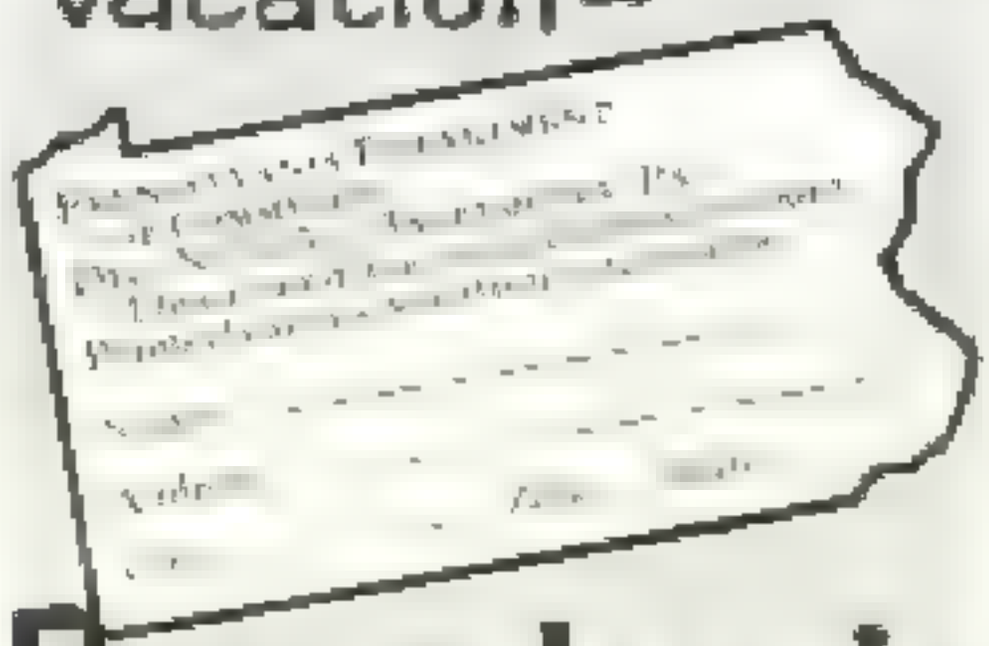

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each day, between Chicago
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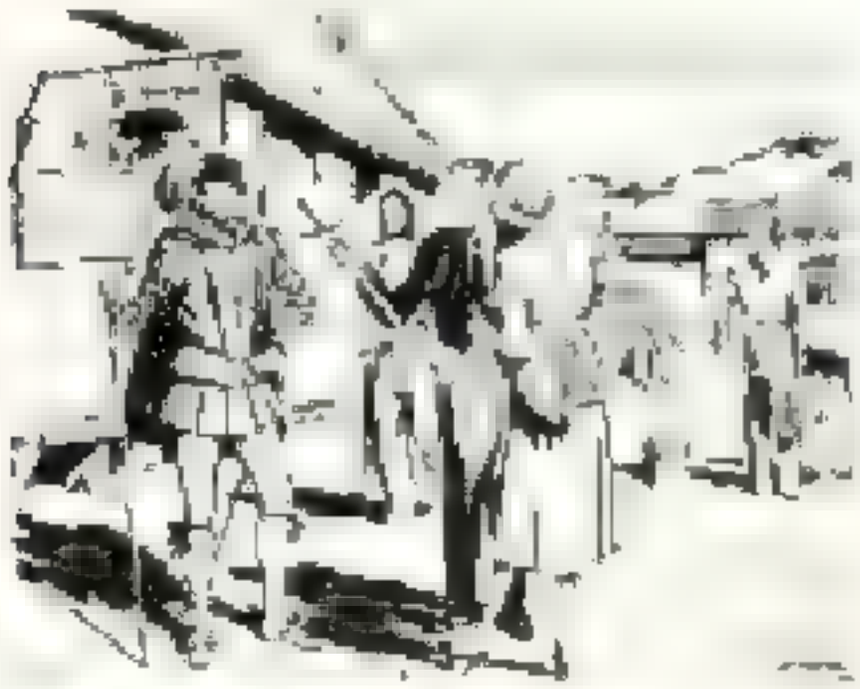

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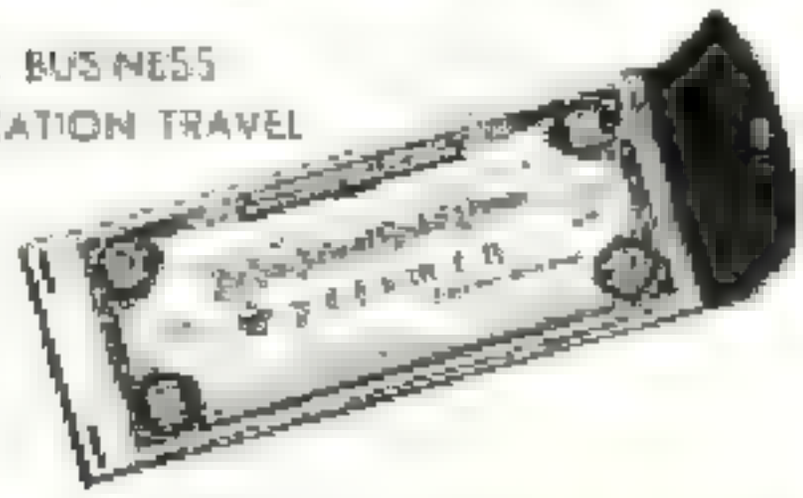

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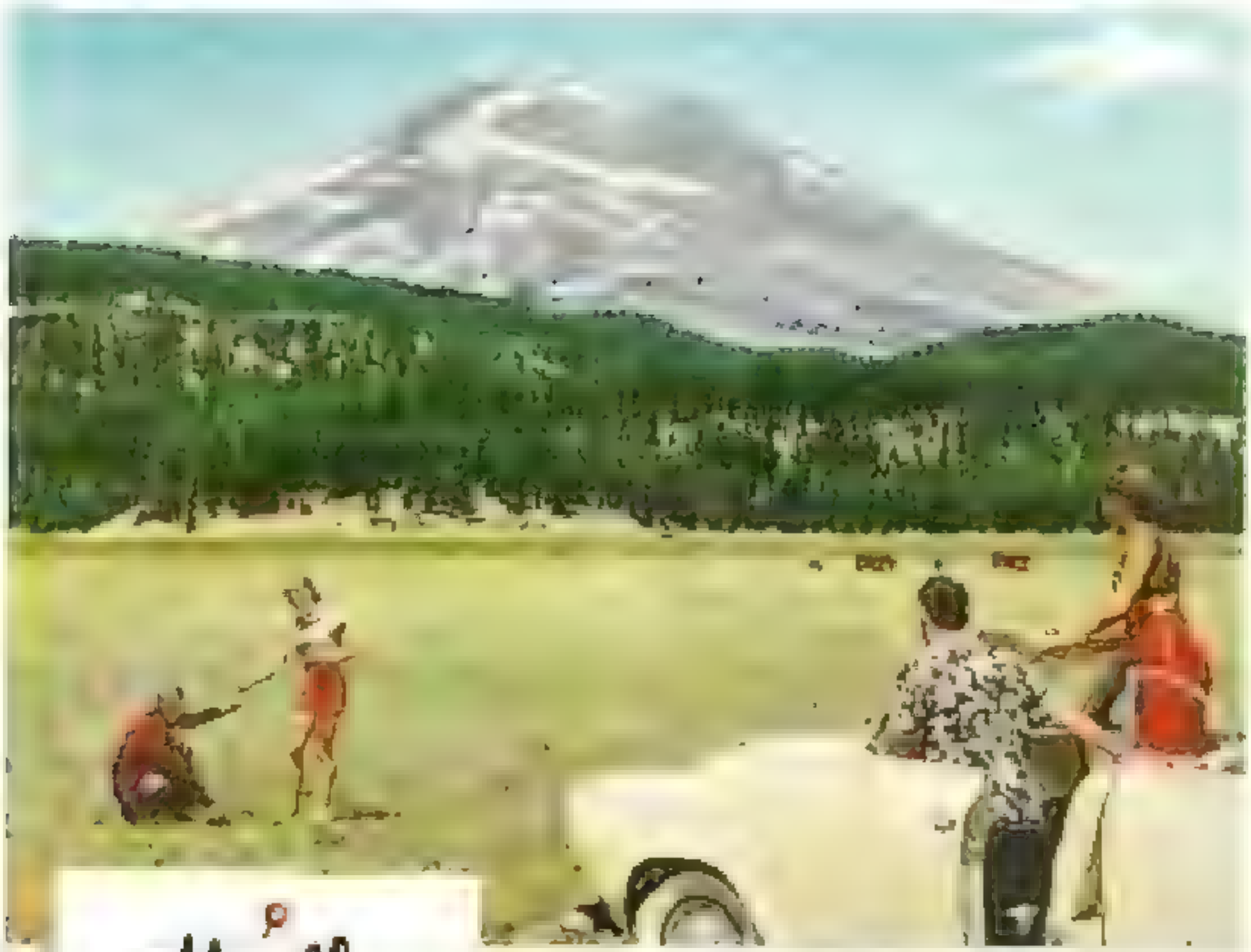

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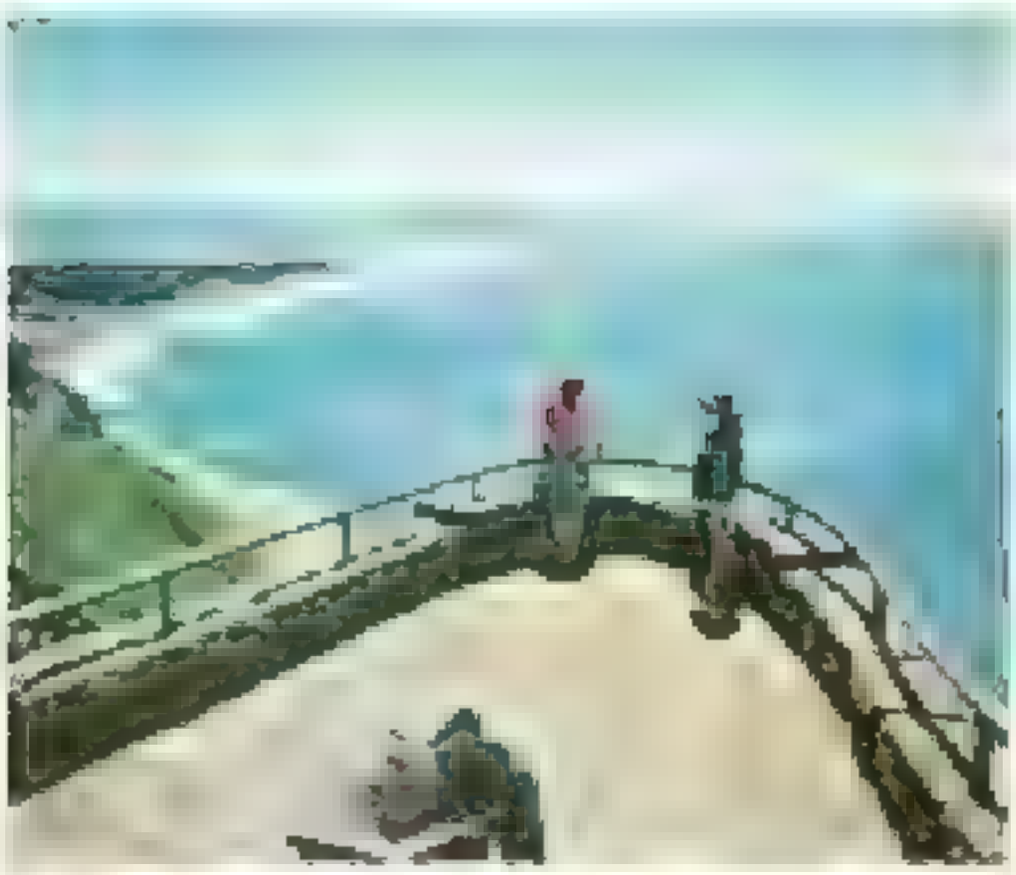

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SEE ALL OF

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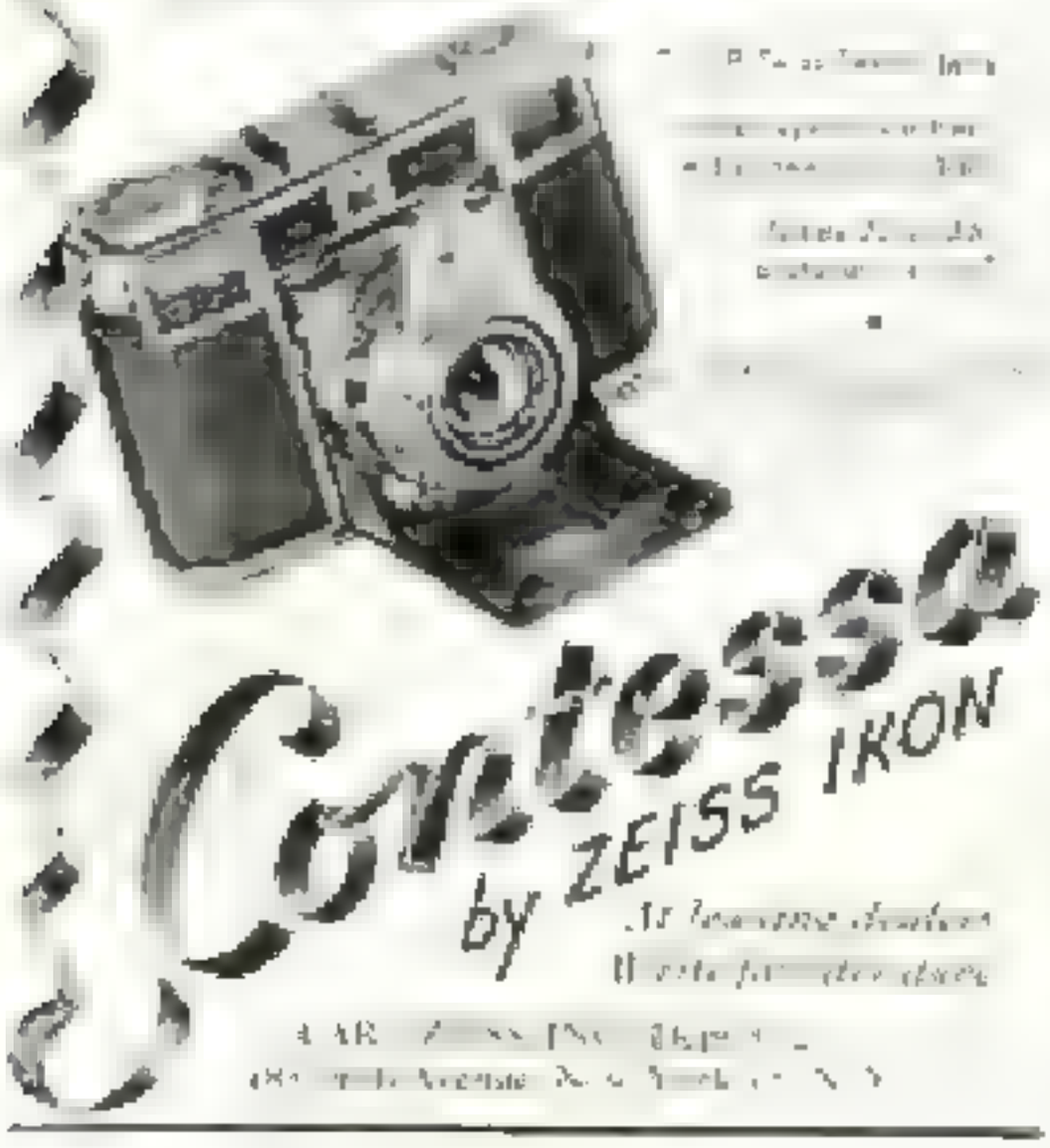

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[illegible] Barre Guild monument can be identified [illegible] Barre Guild [illegible] on this [illegible] quality [illegible] workmanship [illegible] work for the [illegible] of the [illegible] Consult [illegible] in full confidence.

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To be [illegible] than a [illegible] season when San Diego [illegible] with gentle, [illegible] days and [illegible]! Come now where folks are [illegible] on a [illegible] bay or [illegible] themselves in the flower-warm but desert [illegible]. Take an OLD MEXICO [illegible] and the Sports in Kings Manor [illegible] — the time, [illegible], relaxing in and around [illegible] San Diego County!

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**NO EXTRA COST** on many rail and air tickets to the Coast. Ask your Travel Agent **Now!**

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Please mail me without cost or obligation your descriptive folder which will help to make my California trip more interesting.

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"What scenery! Niagara Falls is simply gorgeous. Why, all through Ontario you'll find beauty spots that take your breath away."

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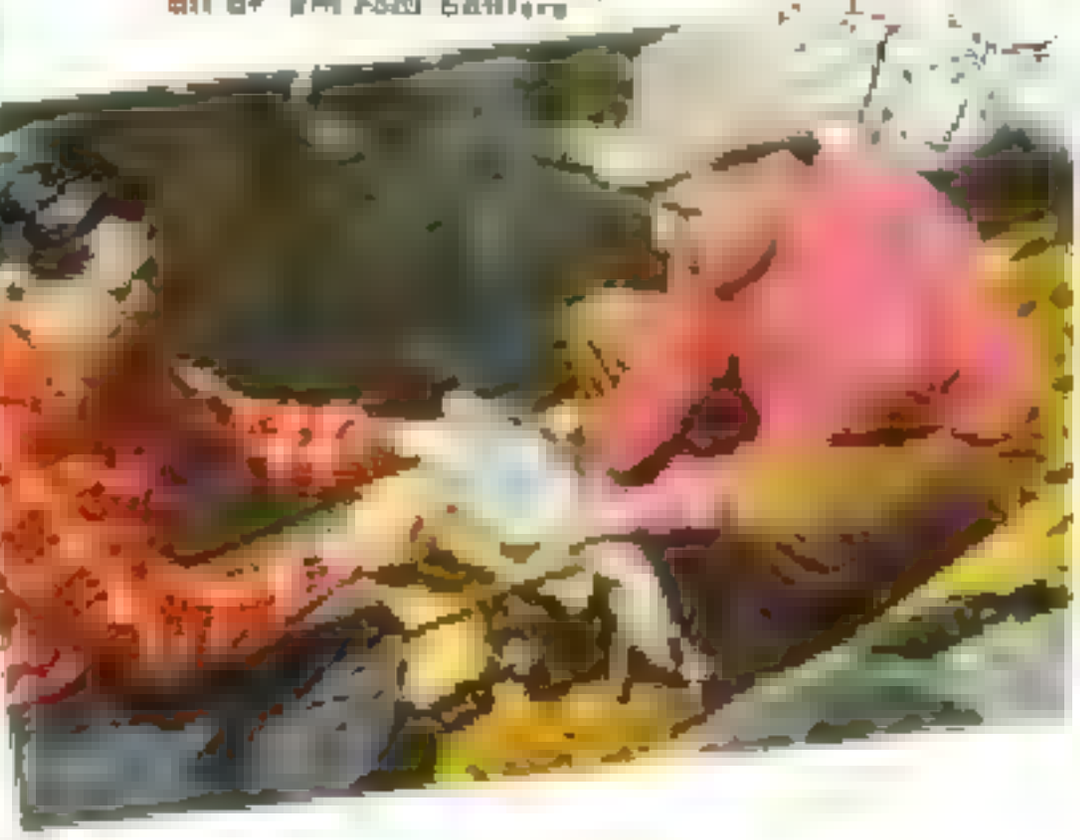

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Please send me free 64 page illustrated booklet and guide map.

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## Travel tips

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- Ontario is within easy driving distance
- Liberal customs exemptions let you take home lots of things duty-free
- 15 Tourist Information Centres offer you every kind of travel service

## Let's go to ONTARIO

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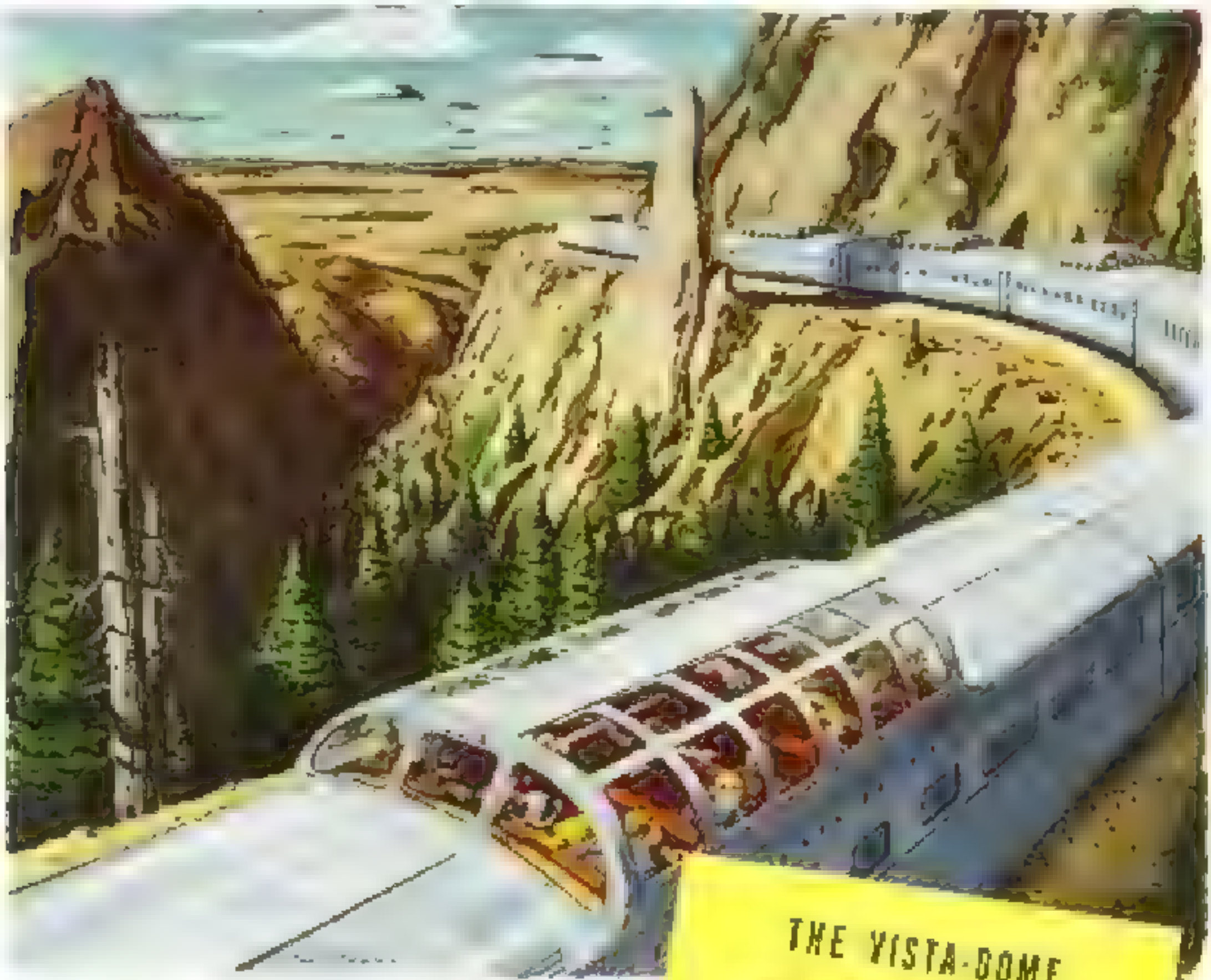

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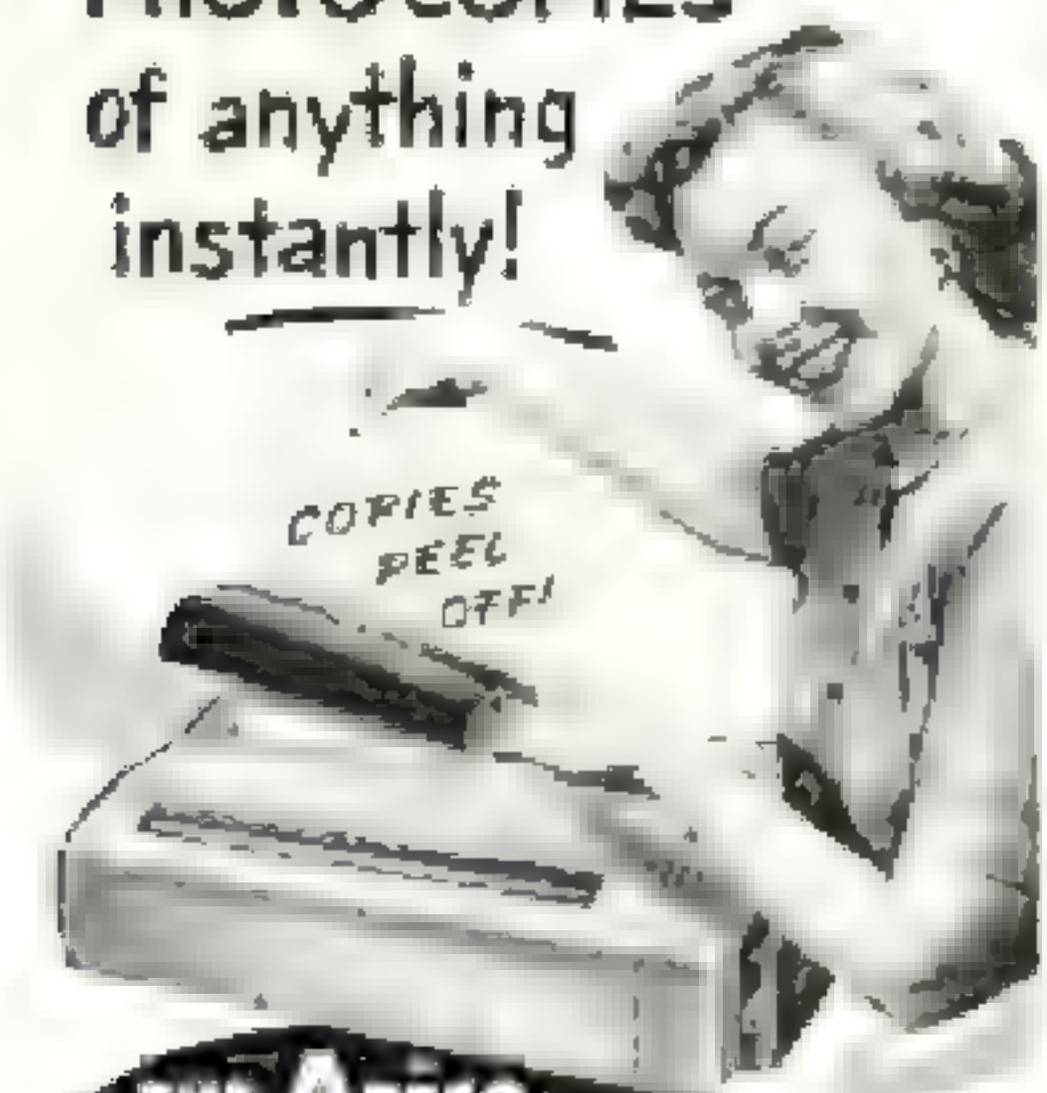


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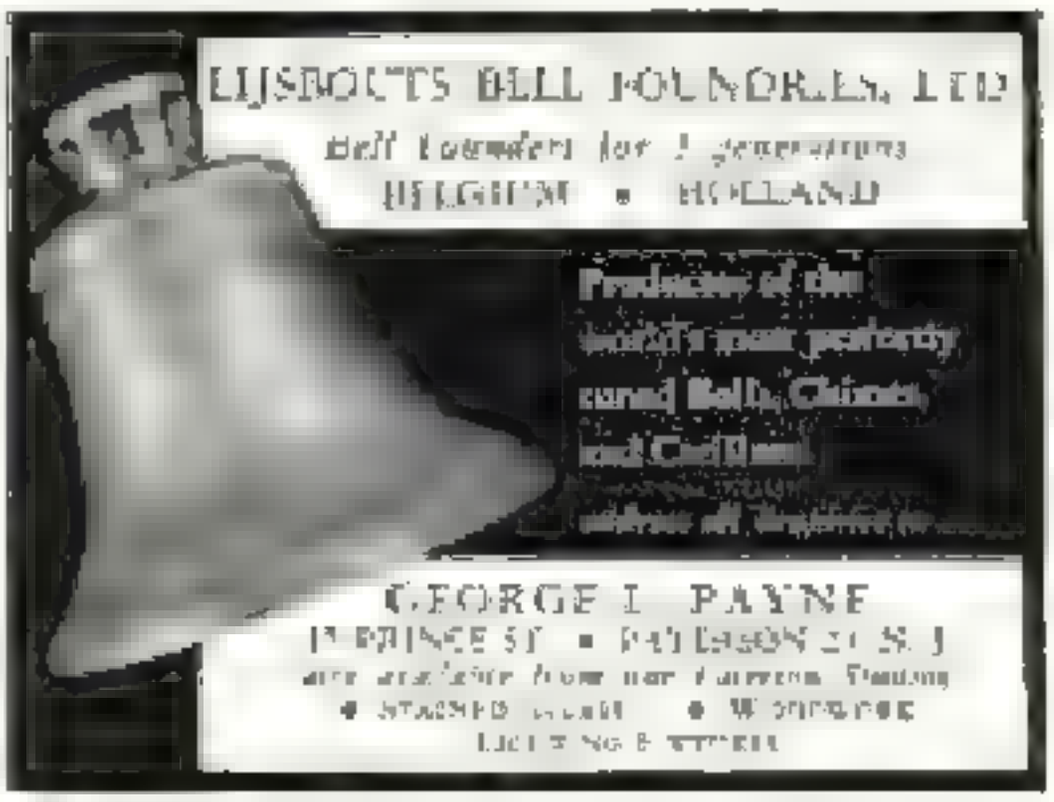


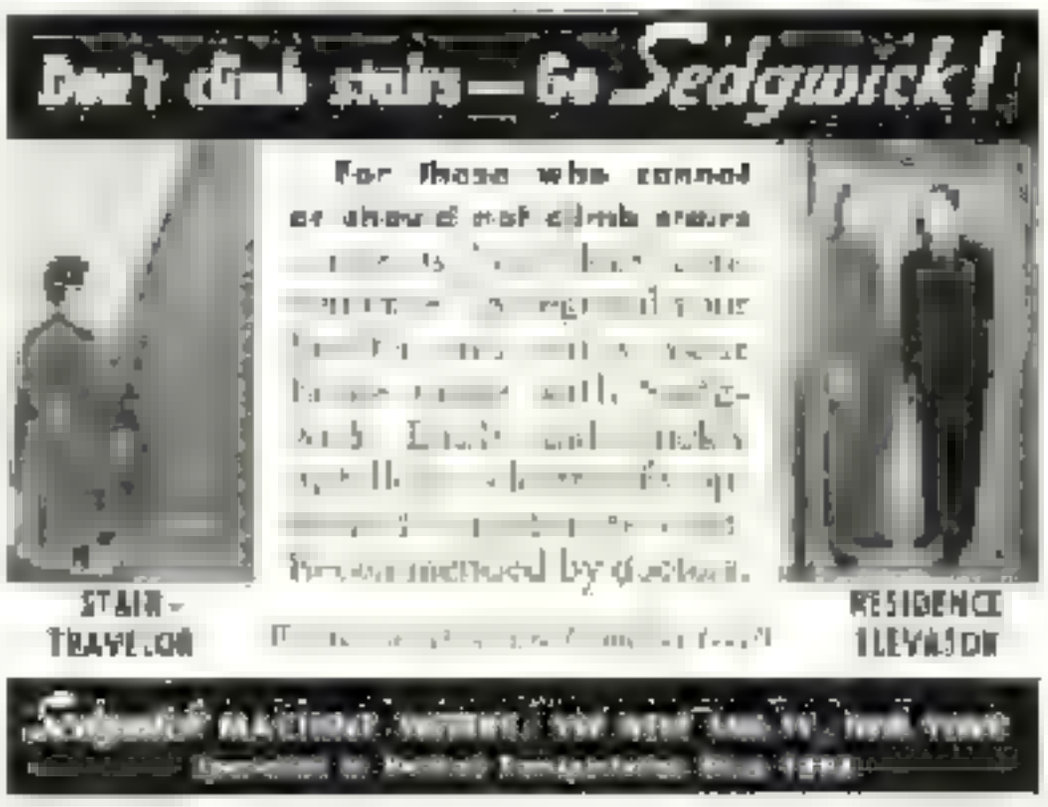

# "CHEERS FOR CHUBBY"

THE CARTOON characters shown here—Mr. and Mrs. Chubby—are the "stars" of Metropolitan's film, "Cheers for Chubby." This film humorously presents a serious subject—the health hazards of overweight.

Medical authorities report there are some 25 million Americans who, like the Chubbys, are overweight—or who tip the scales to a point at least 10 percent higher than is best for their physical and mental health.

Today, doctors are urging all overweight people—especially those beyond age 30—to bring their weight down to normal and *keep it there throughout life.*

This is because excess pounds may place a burden on vital organs, particularly the heart. Obesity may also shorten life as it is closely associated with heart and circulatory diseases, gall bladder trouble, diabetes, arthritis, and other disorders.

Here are some facts that the Chubbys learned about reducing—facts that may help everyone to get the greatest benefit from a weight-reduction program.

**1. Avoid all "quick and easy ways to reduce."** Chubby tried exercise only—and found that he had to run 38 miles to shed one pound! Mrs. Chubby tried the latest reducing fads with even poorer results. They found that so-called "simple ways to reduce" do not work—and that self treatment with reducing pills may actually be dangerous.

**2. Consult the doctor for advice about reducing.** The doctor helped the Chubbys to lose weight safely. He prescribed a balanced diet that would not only remove excess pounds, but would also allow the Chubbys to eat a variety of appetizing, nourishing foods. He also helped them to develop a new set of permanent eating habits.

**3. Follow a balanced diet while reducing.** The Chubbys' reducing diet was planned so as to protect their health while reducing. They found that they could eat a variety of foods—lean meats, fish, vegetables, butter, fruit, milk, eggs, and whole-grain or enriched bread. These foods provide the protein, vitamins and minerals needed for building and repairing the body.

**4. Develop new eating habits.** The Chubbys learned to avoid those dishes that been with "hidden calories," such as gravies and sauces. By [illegible] to form new eating habits, they lost weight safely—from two to three pounds a week. They also increased their chances for additional years of happiness, health and [illegible]—because they knew that—*the shorter the waistline, the longer the life line!*

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City State

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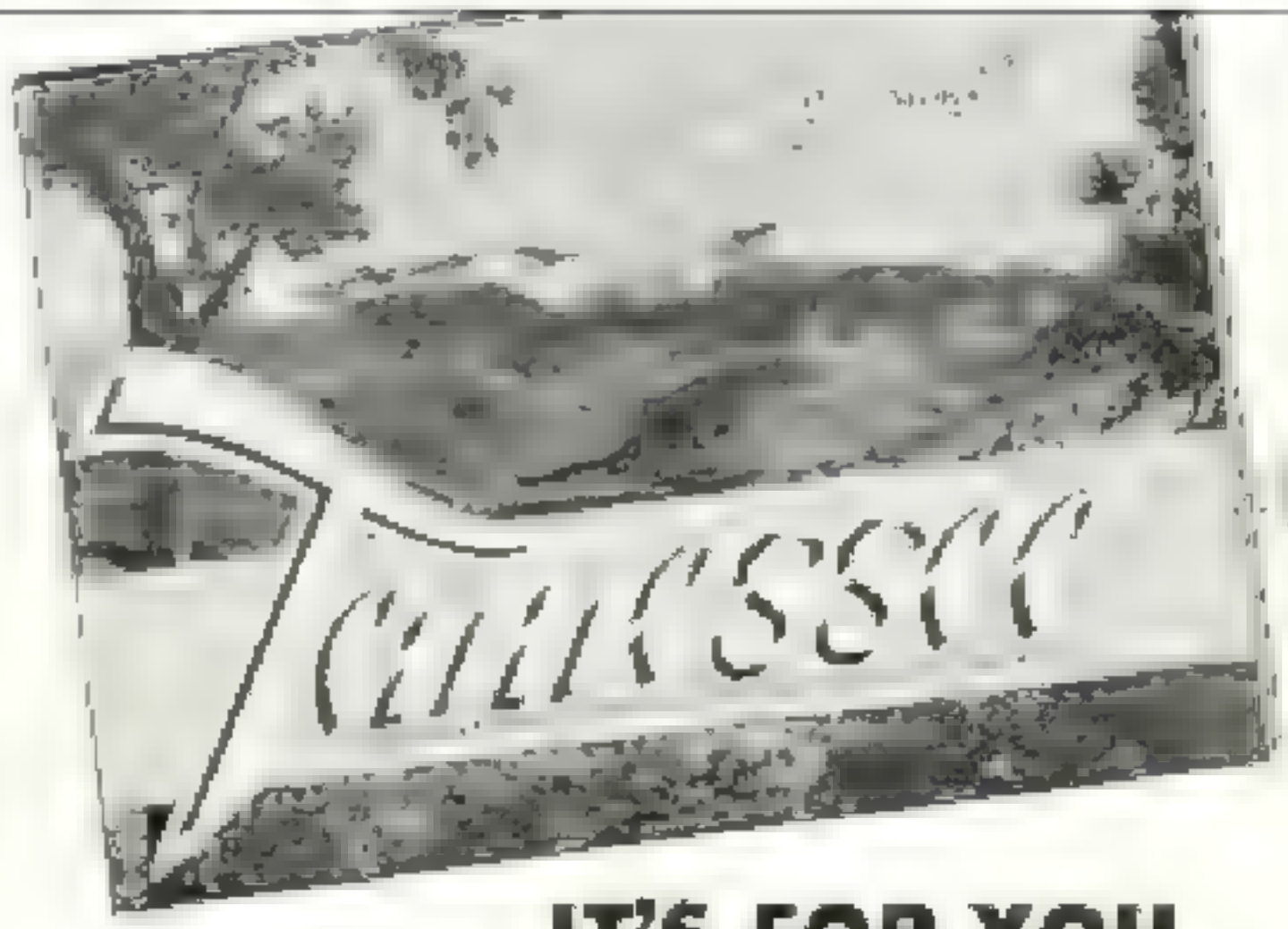

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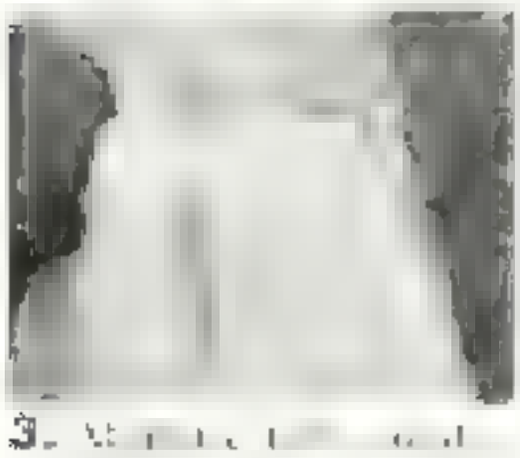

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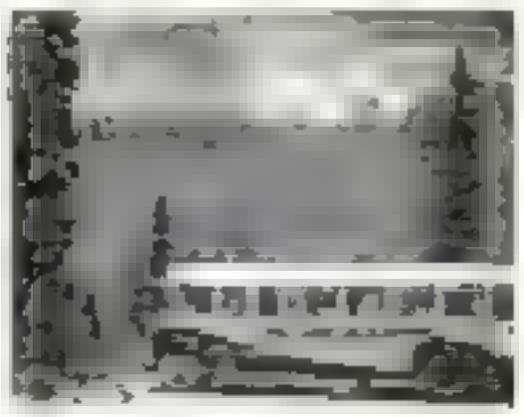

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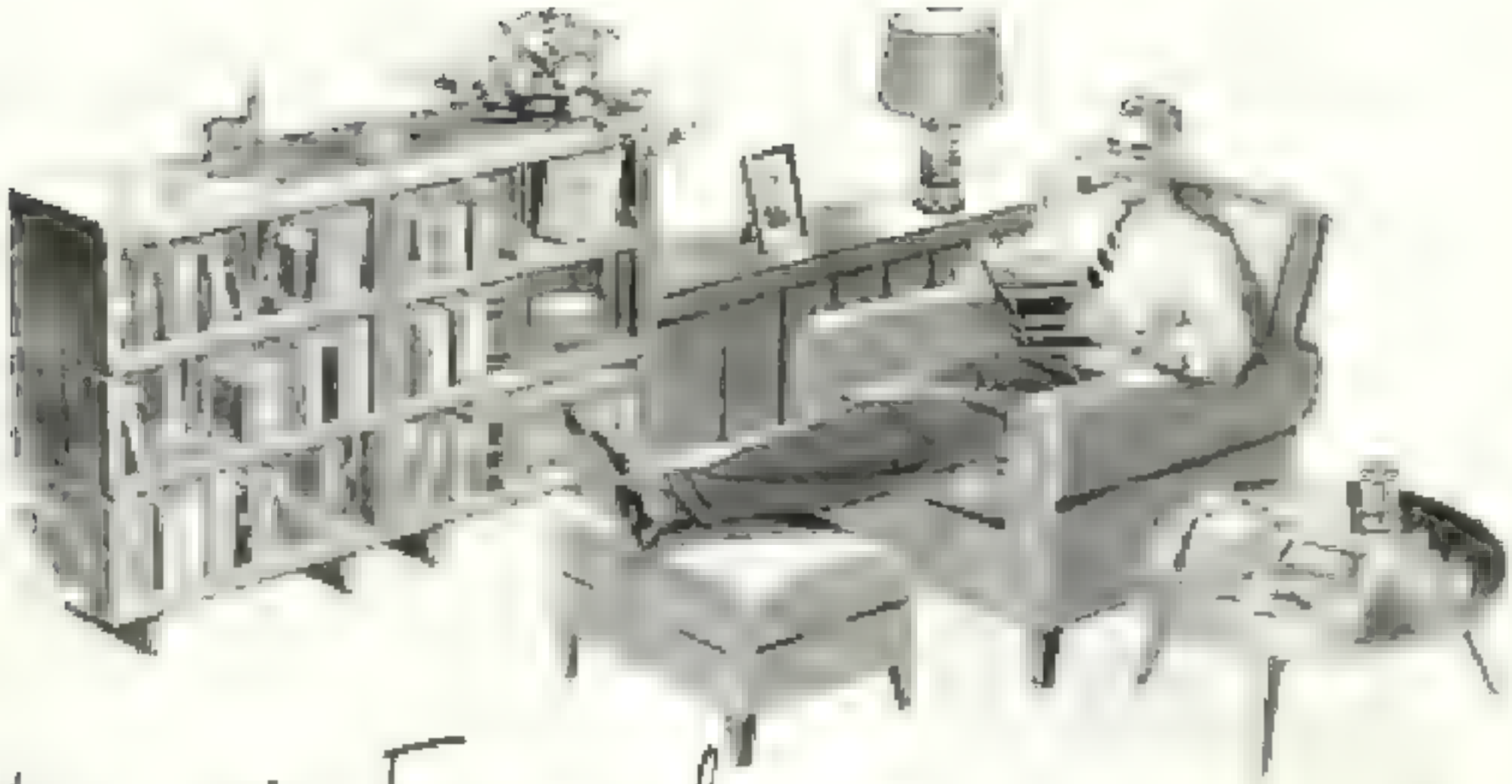

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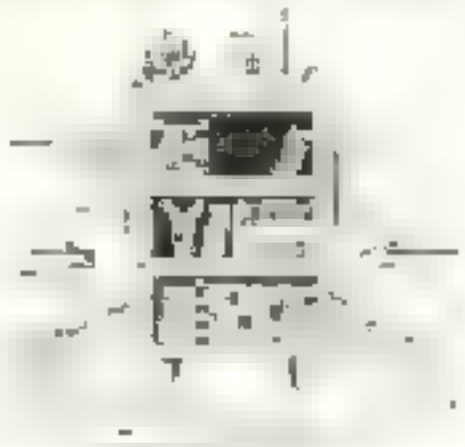

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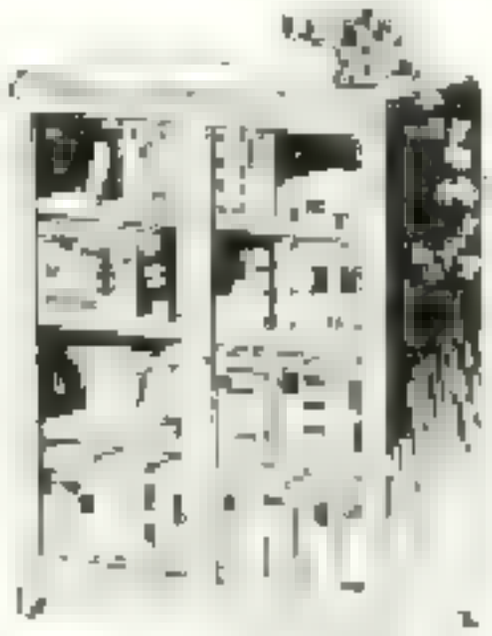

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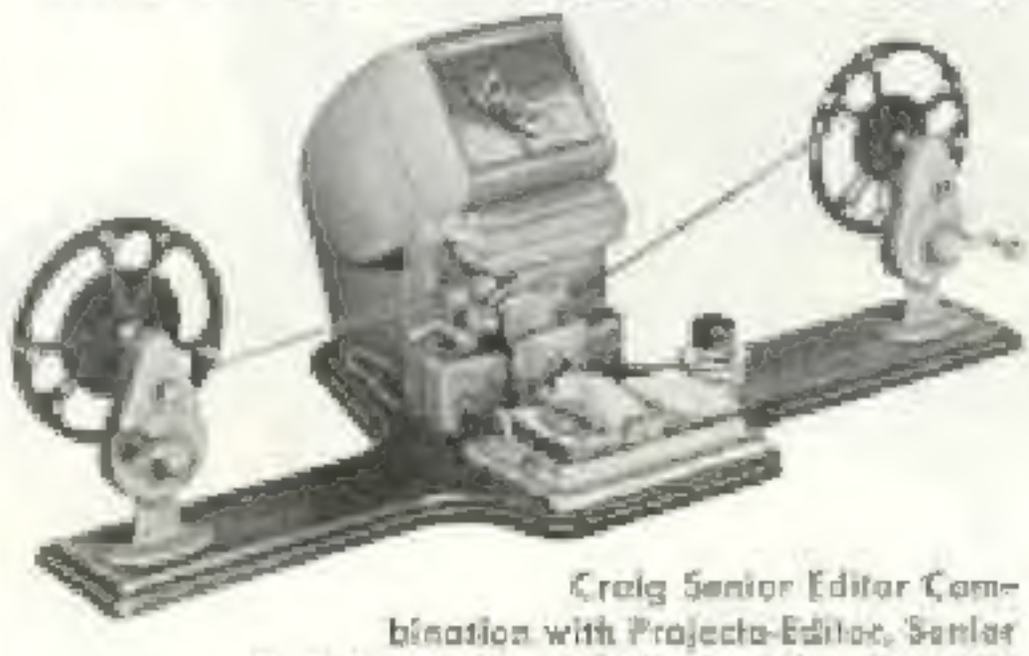

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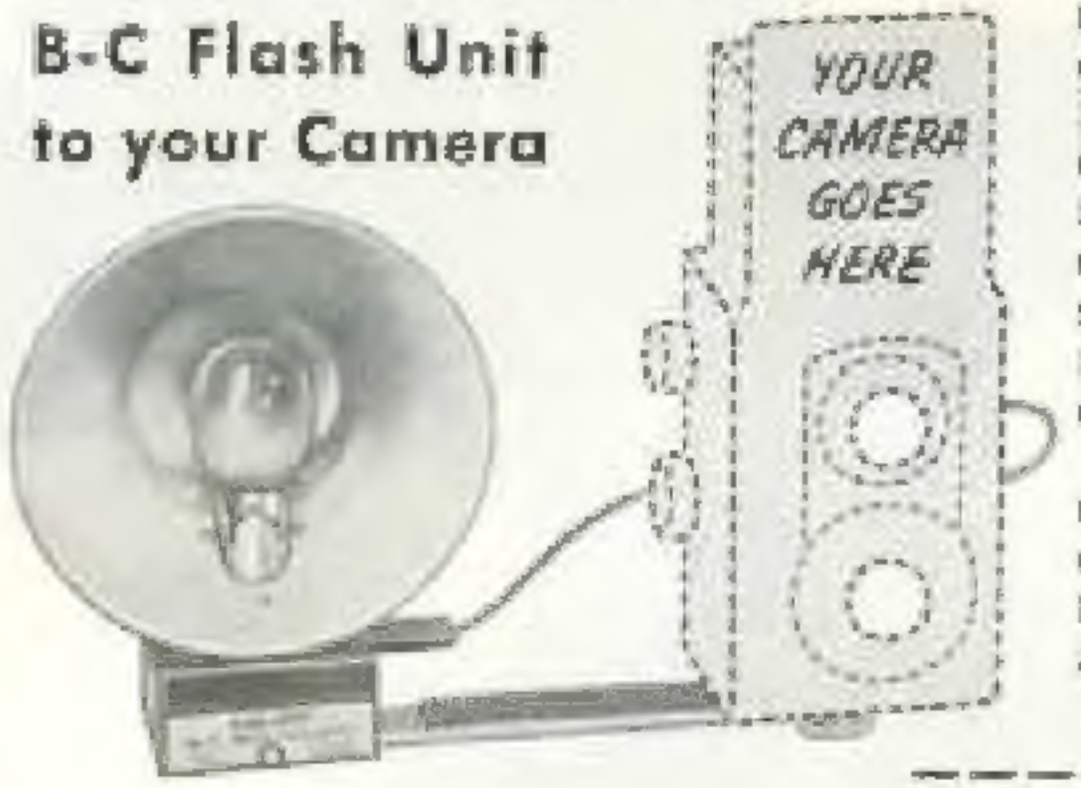


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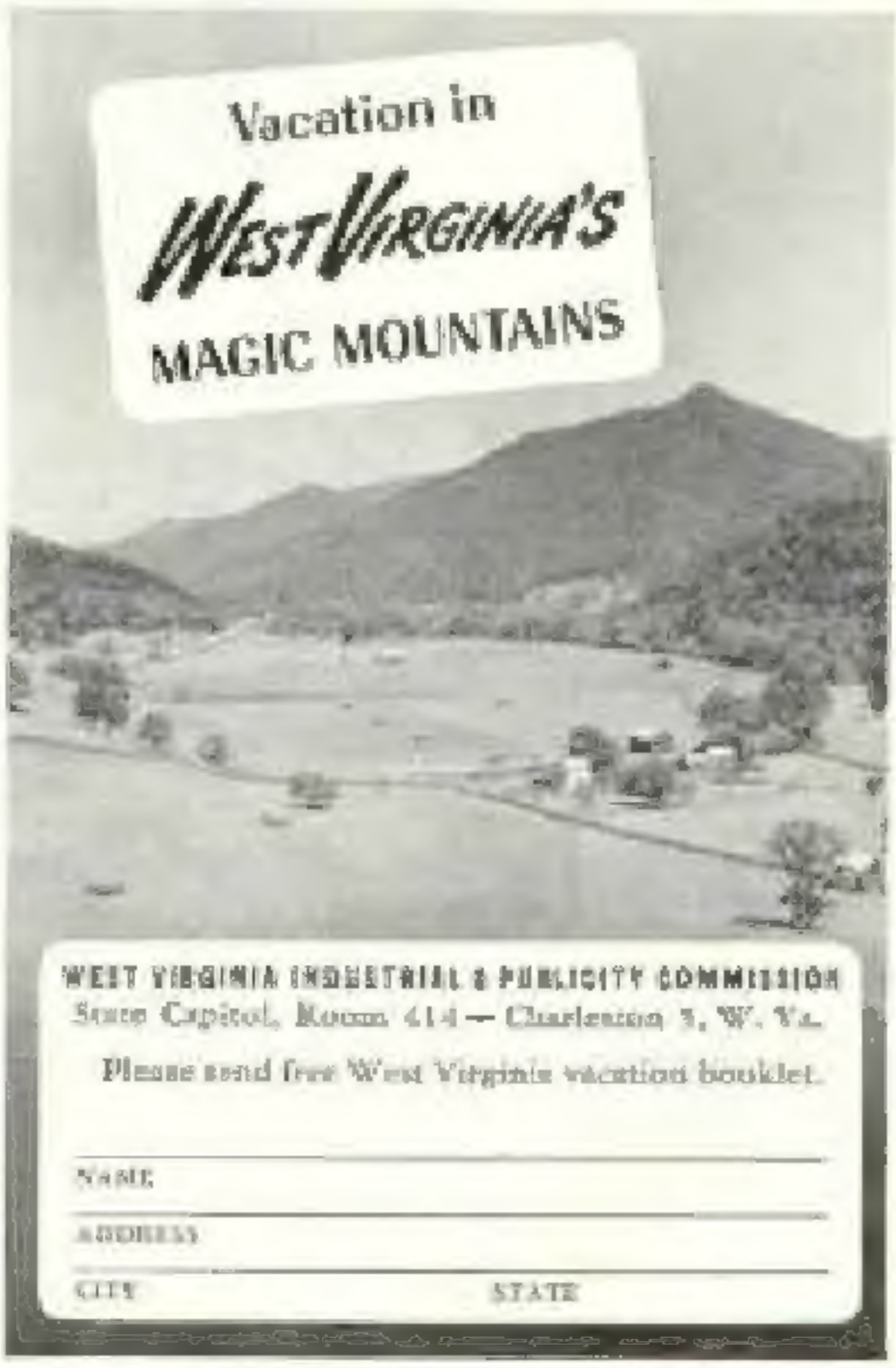


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